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Railway Age

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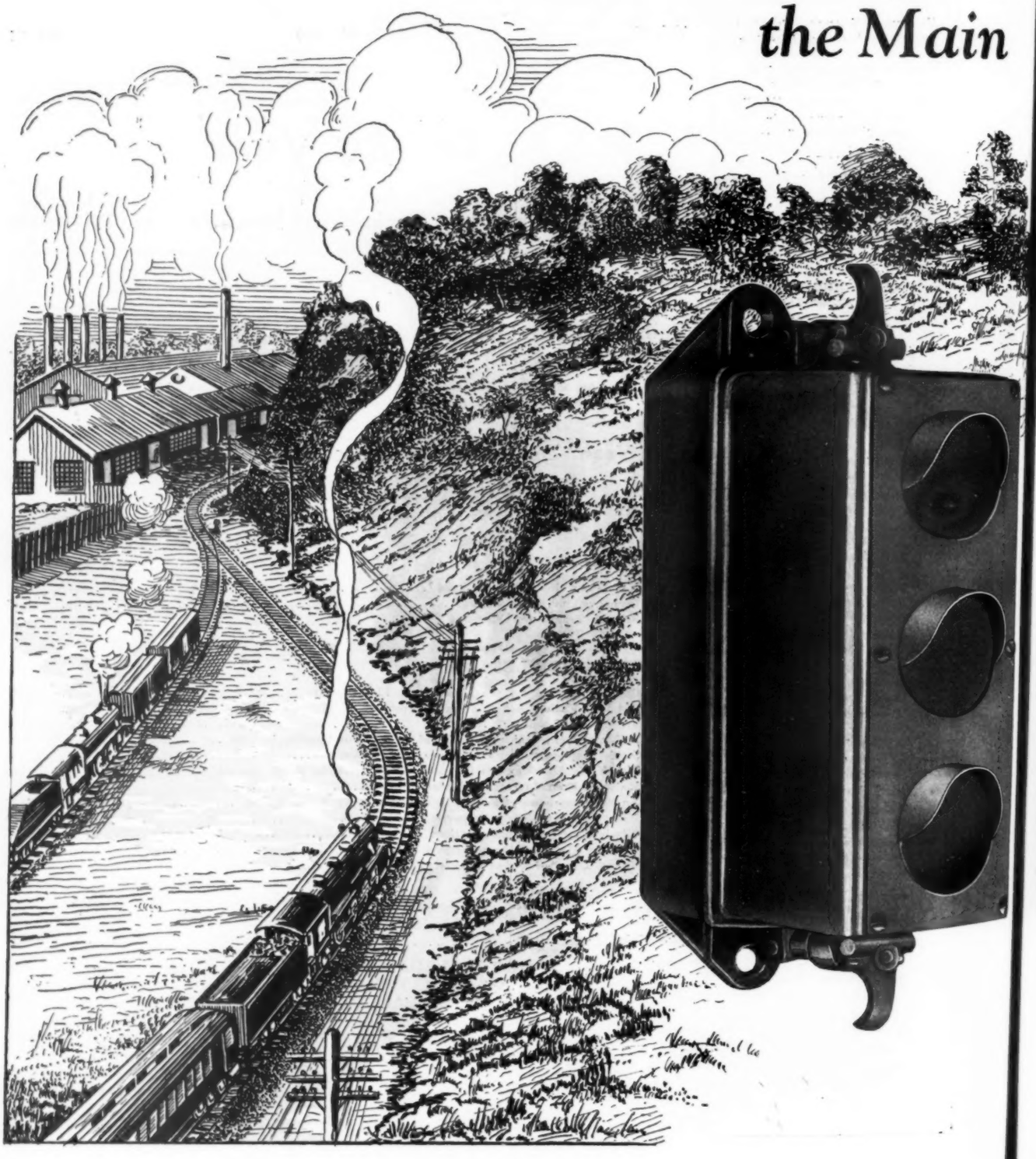

Railway Age

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Hoch-Smith Resolution Nullified

THE recent decision of the United States Supreme court in the California deciduous fruit case has as completely destroyed the famous Hoch-Smith resolution as if the court had held it unconstitutional. The resolution was passed by Congress to cause the Interstate Commerce Commission to make especially low rates on the products of the agricultural and other depressed industries, and, if needed, compensating advances in the rates of more prosperous industries. It was directed to make the "lowest possible lawful rates" on agricultural products that were compatible with the maintenance of adequate transportation service. The commission naturally assumed that Congress passed the resolution because it wanted a change made in the government's policy of rate regulation which would be favorable to depressed industries, and especially agriculture. It therefore ordered reductions in the rates on several commodities, including coal from the Pennsylvania and Ohio mines, and deciduous fruits from California, and in so doing used language plainly implying that it would not have regarded these reductions as reasonable under the laws that existed before the Hoch-Smith resolution was passed.

Certain language used by the Supreme court shows that the court believed that the Hoch-Smith resolution would be unconstitutional if the commission had been right in interpreting it as meaning that it required rates to be made in a way that would have been unlawful if the resolution had not been passed. The court said that if the words of the resolution "mean no more than that the depressed condition of the industry is to be given such consideration as may be reasonable, considering the nature and cost of the transportation service and the need for maintaining an adequate transportation system, they work no change in the existing law. But," it added, "if they mean more and are intended to require that rates be reduced to some uncertain level below that standard they give rise to a serious question respecting the constitutional validity of the paragraph of which they are a part." It held, however, that the resolution, correctly interpreted, did not change previously existing law requiring that rates be made just, reasonable and non-discriminatory, and that, therefore, the commission's interpretation of it in the deciduous fruit case was wrong. This means that the law of rate making has been and is exactly the same as if the Hoch-Smith resolution had never been passed.

Effects of Decision

The decision should accomplish two purposes. First, it in effect prohibits the commission from going any further in its efforts to reduce rates to help depressed industries merely because they are depressed, and is an invitation to the railways to seek the restoration of rates that have been reduced under the Hoch-Smith resolution. Secondly, it plainly implies that any legislation by Congress or order of the commission in which it was attempted to compel the railroads to accept rates in any particular territories or on any particular classes of traffic which could not meet the same standards of justness and reasonableness as other rates would be unconstitutional. There is nothing in the decision to prevent the commission from continuing with the general investigation of the freight rate structure required by the Hoch-Smith resolution, but after it is finished any rates which may be made must meet the standards of reasonableness and justness that were applicable before the resolution was passed.

In an address before the Traffic Club of Milwaukee on January 15, 1929, Commissioner Meyer of the Interstate Commerce Commission said: "I might summarize what appears to me to be the underlying theory expressed in the resolution by saying that it attempts to make the railroads in the United States the shock absorber and balance wheel for the entire economic life of the country, to the extent to which this may be accomplished through the instrumentality of railroad rates." Previously the law had said that it was the duty of the commission "to deal with transportation conditions and not with commercial conditions," but the resolution changed this by requiring it to deal with commercial conditions. He expressed the opinion that to carry out the resolution would keep a hundred Solomons busy a hundred years. The Supreme court's decision, in effect, directs the commission to cease and desist from its efforts to so regulate rates as to make the railroads the "shock absorber and balance wheel for the entire economic life of the country," and to resume regulating them in accordance with the cost and value of railway service.

The commission is an agent of Congress and must try to carry out the instructions of Congress as it understands them. Every person familiar with the facts knows that the Hoch-Smith resolution was written and passed by politicians to placate the farmers, and that it was actually intended by members of Congress who gave any real consideration to its meaning to cause railway rates to be used as a means of subsidizing the agricultural industry through freight rates at the cost of the railways and other industries. The investigations and changes in rates the commission undertook under it have seriously interfered with all its other work, and delayed decisions in innumerable cases. It has cost the commission, shippers and the railways millions of dollars. And now the Supreme court has held that the resolution really never did mean anything that previously existing law did not mean, and that the commission should practically disregard it.

It might be expected that after this experience Congress would be less disposed to indulge in political interference with railway regulation. Any one who entertains such expectations is an optimist. Congress will continue to use railway regulation for political purposes as long as its members think they can gain by so doing. The only thing that will ever stop political interference with regulation will be a public sentiment that will condemn it.

Investment in Research Pays

IN so far as technical progress is concerned, the railroads have occupied a favored position in that they have enjoyed the fruits of much research conducted under the auspices of others. They have profited greatly from the development work conducted by the supply manufacturers and from the advances made in chemistry and metallurgy and the applied sciences that have been brought about through research conducted by a wide variety of agencies outside the railway field.

But, like all modern industry, the railroads have discovered that they have problems peculiar to their own operations which cannot be solved merely by the analytical application of principles evolved through general research in the sciences. The technical associations of railway officers are constantly confronted with the limitations of this procedure, and the need for something more specific has given rise to such investigations as the air brake and draft gear tests and the work of the Joint Committee on Stresses in Track which have been initiated and sponsored by the railways themselves.

These projects are commendable, but in terms of the expenditures involved they are not commensurate in the aggregate with what other industries are doing. As an illustration, the Aluminum Company of America has just completed a laboratory at New Kensington, Pa., that represents an investment of a million dollars and will require nearly as large an outlay each year for operation.

The scientist cannot contract to deliver a discovery at a fixed date and at a predetermined cost. Therefore, expenditures for the conduct of individual investigations must be regarded as highly speculative. But this does not mean that industry occupies the rôle of the good angel for the scientist. On the contrary, industry has gone in for research but for one reason—because it pays in the long run.

It is true that much of the return realized from industrial research has been in the form of discoveries made as a by-product of the quest for the solution of some particular problem of operation. It may be that the railroads are not in a position to capitalize on such by-product discoveries, but surely they are now confronted with many perplexing questions, the answers for which will be worth all that the necessary research will cost. It is only necessary to mention one—the transverse fissure, the cause of which seems as elusive today as it was 15 years ago. According to a report by James E. Howard, appearing elsewhere in this issue, there is as much reason to believe that the cause lies in the track as in the mill; but whatever the cause, it will be found only through exhaustive scientific investigation. True, this will cost a great deal of money, but who is there who will not say that the answer will be worth all that it costs, and more?

Railway Traffic and Earnings

IT is impossible to determine whether the movement started last fall by government officials and business leaders to maintain business actually has had any substantial beneficial effects. The economic forces that determine general business activity are so powerful that no one can tell the extent to which natural tendencies are counteracted by such special efforts. It is now beyond question, however, that the efforts made have not produced as great results as were anticipated by those who were optimistic regarding them.

There is no better measure of the volume of production and commerce than the amount of traffic handled by the railways. It was freely predicted that an improvement in general business would begin in the second quarter of the year. The statistics of railway traffic show that no such improvement has begun. In the first quarter of the year freight car loadings declined about 7 per cent, and this resulted in a decline of 9.5 per cent in ton-mileage. In April car loadings declined over 9 per cent, and in May 11 per cent. This indicates that in the first two months of the second quarter ton-mileage declined over 13 per cent. The decline of general business evidently has been greater thus far in the second quarter of the year than it was in the first.

Statistics of railway earnings and operating expenses are now available for the first four months of the year. Freight and passenger traffic have declined in about

the same proportions. In the first third of the year total earnings were 10.7 per cent less than last year, and smaller than in the first third of any year since 1922. Operating expenses were reduced about 6 per cent, and also were the smallest since 1922. Net operating income declined 32.5 per cent, was the smallest in amount since 1922, and actually yielded a smaller percentage of return on property investment than in the first third of any year since 1921, having been at the annual rate of 3.68 per cent in the first third of 1922, and only 3.56 per cent in the first third of 1930.

The railways are divided into eight regions. Those of the New England region earned at the annual rate of 5.35 per cent, those of the Pocahontas region, 7.9 per cent, and those of the Central Eastern region, 4.01 per cent. In all the other regions the railways earned at average annual rates of less than 4 per cent. Those of the Southern district earned at the rate of 2.94 per cent, and those of the Northwestern district at the rate of only 1.61 per cent.

How to Prevent Deflation

It has not been fashionable recently to tell the facts about business. Those who do so are likely to be criticized upon the ground that they help to make business worse. Whatever may be true as to other industries, this is not true as to the railroad industry. The facts about the railroad situation should be told and emphasized to promote a permanent improvement of that situation. The conditions now prevailing in the railroad industry are not due entirely to the operation of ordinary economic forces, as are the conditions that exist in most other industries. They are largely due to transportation policies followed by the government, with the backing of many farmers and business men. Railway rates have been kept too low by regulation, and large amounts of traffic have been diverted from the railways by government subsidizing of competing means of transportation. The railways have never been able to earn a fair return even in years of good business; and consequently they are not able even to approach a fair return in years of poor business.

There are some very important things that public men and business men should learn from the developments that have occurred within recent years. One of these is that the only way to prevent deflation is to prevent inflation. It was quite evident long before the stock market collapsed in the fall of 1929 that prices of stocks were becoming enormously inflated. If public men and business men had made as great efforts in 1928 and the early part of 1929 to stop inflation as they have since made to arrest deflation, their recent efforts to arrest deflation might have been less necessary. All past experience, including that of recent months, shows that unless timely and effective measures are adopted to prevent inflation all measures to prevent deflation and its results will be comparatively ineffective.

Another thing that public men and business men should learn is that unless the rates of the railways are kept high enough to enable them to earn more than a fair return in periods of good business, their net operating income will decline so low in periods of poor business that they will then have to retrench severely, and become a menace rather than a help to the stabilization of general business. After having tried "business as usual" in the early part of this year, many railways are now vigorously retrenching, and large amounts of maintenance work are being deferred. This is tending to make general business worse. As long, however, as the government directly and indirectly regulates the railways as it does now, and farmers and business men support it in doing so, neither public men nor business men can fairly criticize railway managements for the means they adopt to prevent railway net return from becoming dangerously small.

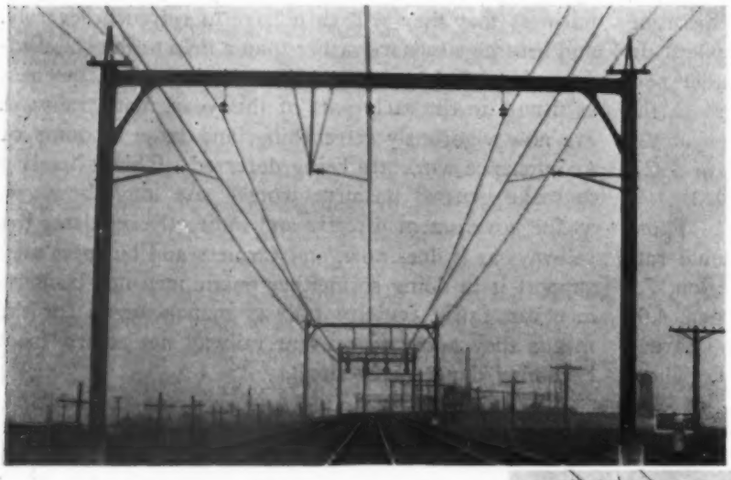
Business Conditions and Taxes

For some years prior to the collapse of the stock market the country was flooded with theories to the effect that economic conditions and business methods were so changed that the "economic cycle" had been abolished and we would have no more periods of bad business. All this economic buncombe having been disposed of, it is now evident that business must work itself out of the present depression in much the same ways that it has worked itself out of past depressions. The old gospels of hard work, thrift and foresight are once more coming into vogue. They should come into vogue in government as well as in private business. Probably the worst economic influence to which the nation has been subjected within recent years has been the constantly increasing extravagance of government expenditures for public works, as well as for other purposes. The effect of this has been an enormous increase of taxes, which, because taxes are extremely difficult to get reduced, is weighing very heavily during the present depression upon all classes of business concerns and people.

Probably by the end of summer the demand for goods will begin to exceed current production and a revival of business will commence, but while business men are struggling to get business on a sound basis again they should also be considering how much high taxes are handicapping them in these efforts and what they are going to do to arrest the increase in taxes. In the first third of this year the railways earned only $238,500,000 of net operating income, and paid out $118,500,000 in taxes, their taxes being almost 50 per cent as great as the return they earned with which to pay all their fixed charges and dividends. High taxes are one of the principal causes of the farm problem. High taxes are one of the principal obstacles to business recovery. Business will revive in spite of high taxes; but if public expenditures are allowed to be continued with such reckless extravagance as within recent years it will not be long until high taxes will make real and durable prosperity impossible.

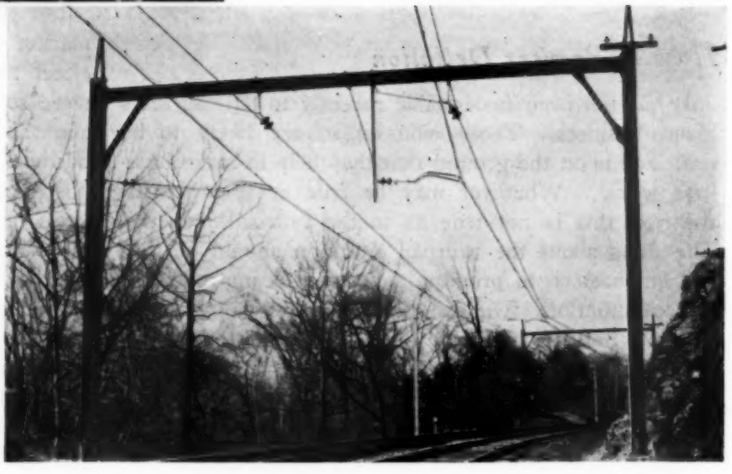
Catenary System for the Lackawanna Electrification

Double contact wires and auxiliary are strung in chords and suspended by main messenger from unguyed supporting structures



Typical Construction for Tangent Three-Track Line Showing Steady Braces

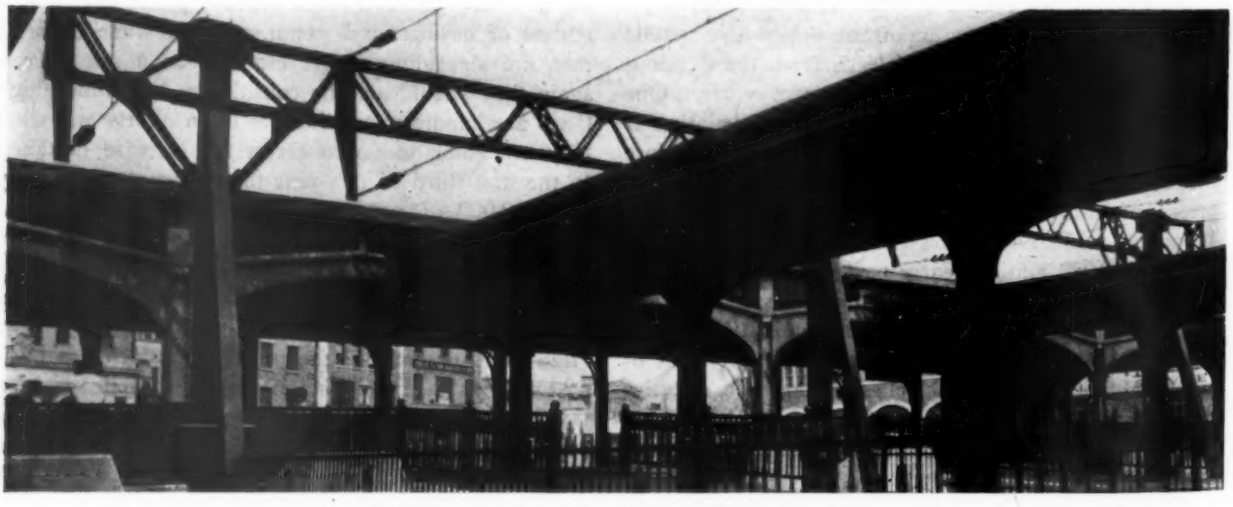
THE 3000-volt direct-current catenary system now in process of construction by the Delaware, Lackawanna & Western will supply power to multiple-unit trains in suburban service operating from the stub-end terminal at Hoboken, N. J., over approximately 70 route miles, including approximately 160 miles of track. Supporting structures constructed from H sections are used without guys. For wide spans a truss is used for the horizontal member. The main messenger, the auxiliary messenger and two contact wires are suspended from two suspension type porcelain insulators. The four wires provide all the required conductivity and no paralleling feeders are employed.



Overhead Construction on a Double-Track Curve Showing Pull-Offs

The scheme of sectionalizing is such that any section may be isolated from the rest of the railroad without serious interruption of service.

Portal type structures are used to support the catenary system. Most of these consist of two vertical Carnegie H sections, approximately 33 ft. long, and a horizontal cross member secured close to the tops of



The Dead End in the Montclair, N. J., Terminal

the columns by angles and bolts. Transverse stiffness is obtained by knee braces between the columns and the cross member. These braces are made of two angle-sections and are secured by bolts.

Columns for three-track structures are 12-in., 79-lb. sections for tangent track, and 14-in., 86-lb. sections for curves up to six degrees. The corresponding horizontal members are as follows: 10 in., 49½ lb.; and 14 in. by 12 in., 69 lb. Column weight and sizes for two-track structures are: 12 in., 65.5 lb.; 12 in., 79 lb.; 14 in., 86 lb. The horizontal members used for two-track structures are respectively 8 in., 44 lb.; 10 in., 60.5 lb.; 14 in. by 12 in., 69 lb. The limiting working fibre stress for the structures is 25,000 lb. per square inch, including secondary stresses resulting from torque, local bending, broken wire load, etc.

When the span between columns is greater than 53 ft., trusses are used for cross members.

A bayonet projecting approximately 3½ ft. above the top of each column and consisting of two angles mounted to form an inverted V is used to support a signal power circuit and a ground wire, which also functions as a supplementary negative return. The ground wire is fastened by a U-bolt near the top of the bayonet. At the base of the bayonet wooden cross-arms are mounted on which the two signal power wires are carried on porcelain insulators. Wooden arms were chosen because of the additional insulation they provide.

Where pull-offs are required between spans a single back-guyed H-section column is used.

Reinforced concrete foundations poured in place are used to support the catenary bridges. Their shape is that of a rectangular column having a flat base or pad. One typical foundation consists of a column 2 ft. 9 in. by 2 ft. 3 in. in section, 4 ft. high, on a reinforced pad 8 ft. long, 3 ft. 3 in. wide and 2 ft. 3 in. thick. These dimensions vary widely with the load, the nature of the soil, etc. The column is secured to the foundation by two bolts cast into the foundation. These bolts vary in diameter from 1¾ in. to 2¼ in.

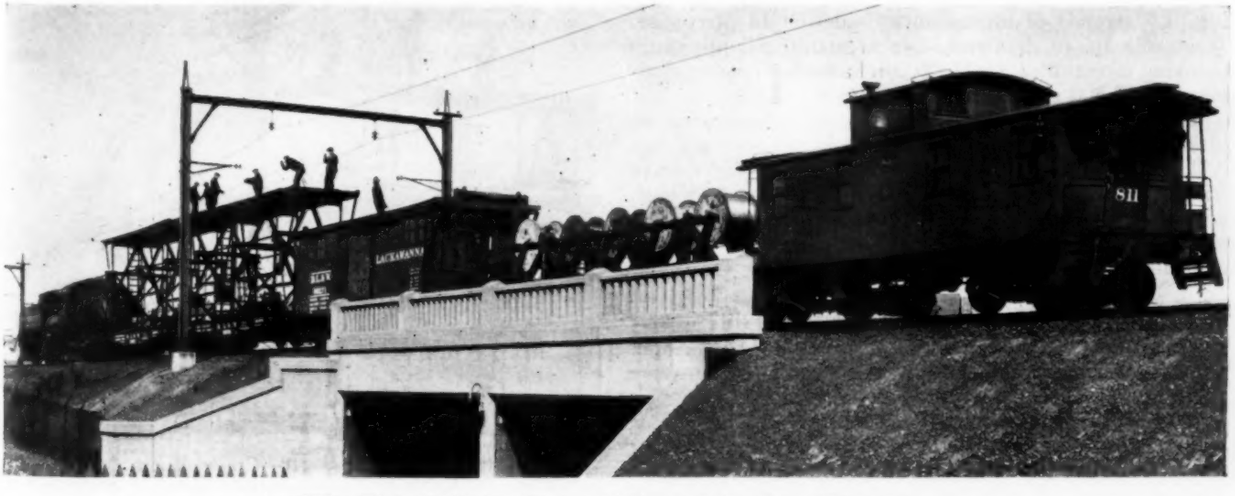
Close-Up of Structure Used on Curved Track

Anchors for pull-off and dead-end guys are made of concrete reinforced with two pieces of old 55 or 67-lb. rail, 5 ft. 6 in. long.

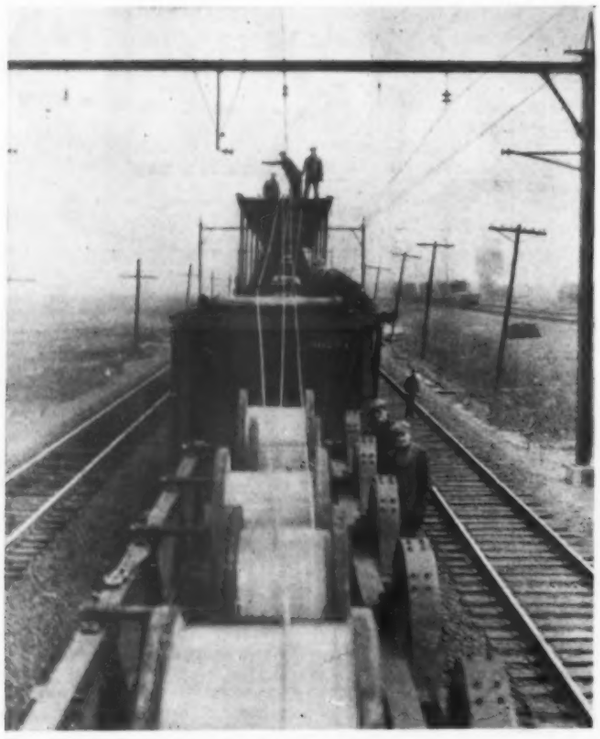
Insulators

Two suspension insulators in series are used to support the catenary system. In most cases these are 10-in. suspension insulators having a wet flashover rating of 90 kilovolts and a dry flashover of 130 kilovolts for the two units.

For pull-offs and steadies two 7½-in. insulators having flashover values for two units of 65 and 105 kilovolts are used. These insulators were selected with a



Wire Train Stringing Contact Wires and Auxiliary Messenger



A Roller Carries the Contact Wires and Messenger Over the Tool Car—Reel Brakes are Shown at the Right

lower flashover so they will act as lightning safety valves.

In the tunnel two 12-in. insulators are used which have 110- and 180-kilovolt flashovers for the two units. Suspension insulators, wedged so as to be rigid, are used for steadies and under bridges where clearance is small and insulators are subjected to flexure or are under compression.

Strings of three heavy-duty strain insulators are used for dead-ends. These insulators are 7 in. in diameter and a string of three has wet and dry flashover values of 98 and 140 kilovolts respectively.

Pin type insulators which have flashovers of 40 and 70 kilovolts are used for the signal power line.

Messengers and Contact Wires

The main messenger is of composite structure, consisting of 7 strands of bronze surrounded by 13 of copper. It is .821 in. in diameter, has a guaranteed minimum breaking strength of 31,000 lb. and a conductivity equivalent to 347,300 circular mils of copper.

The auxiliary is 2/0, 7-strand copper cable having an ultimate breaking strength of 6,000 lb. There are two 4/0 grooved bronze contact wires. These wires have 55 per cent as much conductivity as copper and each wire has a breaking strength of about 12,000 lb. The total conductivity of messengers and contact wires is equivalent to 713,000 c.m.

Fittings

Attachments to the horizontal H-section of the bridges for supporting the contact system consist of a top plate and a bottom L-section secured to the horizontal member by two bolts. The insulators are suspended from a hole in the projecting leg of the L and as it is a clamp fitting it can be moved to any desired position. Supports on trusses consist of light H-beams, which span the truss panel from which the catenary is suspended. The hangers which support the auxiliary messenger from the main messenger consist of two hollow screw clamps connected by a ¼-in. bronze rod, the length of which is governed by its position in the span.

Hollow screw clips secure the contact wires to the auxiliary. The hangers are ordinarily spaced 20 feet apart and there are two clips between each hanger, one connected to each contact wire. The clips are 10 feet from each other and 5 feet from the nearest hanger.

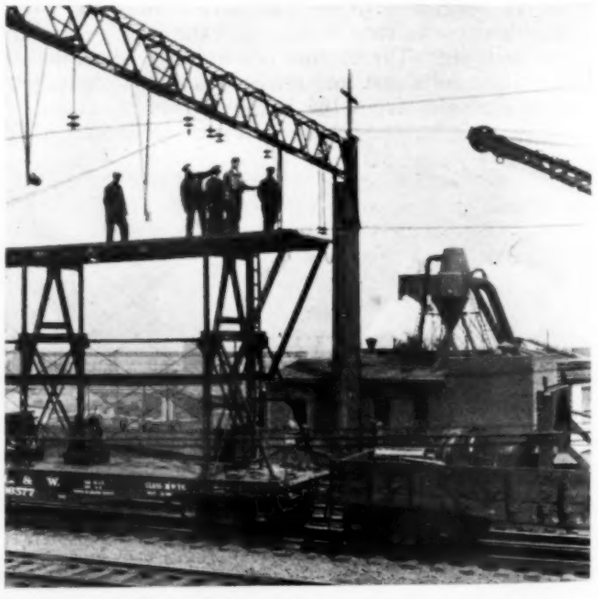
On tangent track, steadies are attached to the auxiliary to keep the catenary from swinging laterally. The steady consists of a hollow screw clamp, a straight ½-in. round bronze rod, two 7½ in. diameter insulators and a suitable attachment. The attachments for both steadies and pull-offs are made from angles and rods bolted to the supporting structure. Several different forms are shown in the illustrations.

Pull-off bars used to hold the contact wire in chords on curved track are connected to the contact wires. They are used in pairs, one connected to each contact wire and each consists of a clamp and a galvanized steel strap 1½ in. by 5/16 in., 3½ ft. long. One pair of insulators and one attachment support both pull-off bars. The straps are curved upward so they will not be touched by a passing pantograph as it raises the contact wire. Over yards and sidings the overhead construction is simplified by omitting the auxiliary messenger and one of the contact wires.

Bonds and Grounds

All bonds are welded to the head of the rail, with one bond per joint except where there is single rail return; in the latter case two of the same bonds are used. Each bond is 8½ in. long and consists of two flexible 1/0 strands. The weld provides full conductivity and the resistance of a bond is equivalent to the resistance of five feet of 130-lb. rail.

Impedance bonds are used at each signal location with cross bonds at every other impedance bond location. From the rail at each cross bond two 1/0 ground wires are carried to the overhead structures. All special bonding on main track is made with double 4/0 bonds. A



Stringing the Main Messenger—Crane Boom is Used to Raise the Cable to Position—Note Short H Sections Which Span the Truss Panels and Support Fittings

supplementary 4/0 negative is used on the Gladstone single-track branch.

All bonds which cross under track circuits are stapled to the ties and are covered with loom to protect the signal track circuits. All cross bonding and substation negative connections are bare wire in wooden trunking filled with asphaltum. Nothing larger than a 4/0 connection is welded to the rail and for heavy leads from substations a number of 4/0 connections are attached to the rail. Pull-off poles, etc., which are not connected to the ground wire, are bonded directly to the rail.

Erection Methods

Steel reinforcing for foundations is assembled at central points in the form of complete reinforcing units for each foundation. The units are distributed to their proper locations. The holes are dug and fitted with forms and the reinforcing with the anchor bolts held in place by a templet.

The holes are then filled with concrete by a concrete train consisting of a locomotive, a special tank car with a heating boiler, a cement car, a flat car equipped with a concrete mixer and measuring bins, a crane for loading the bins, several cars of aggregate (mixed sand and crushed stone) and a caboose.

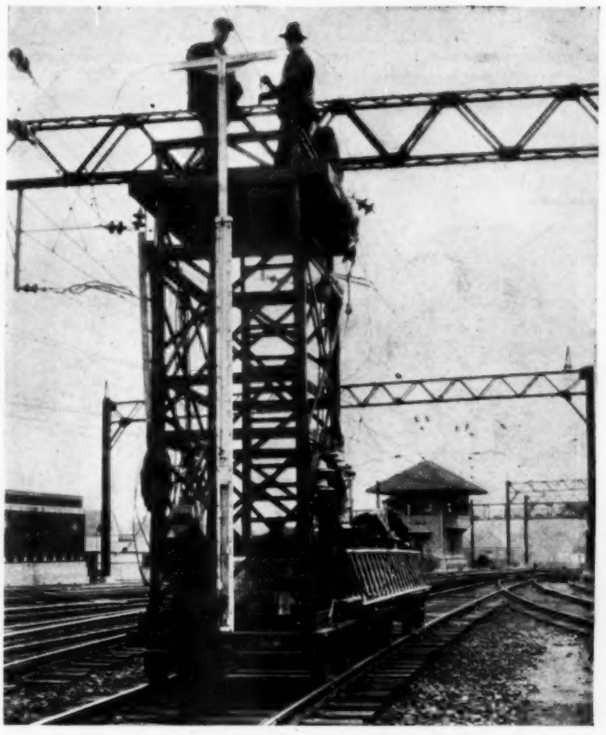
A crane is used to erect the steel work and the usual method consists of erecting a line of columns from each outside track and later placing the cross member from the center track, or from one of the outside tracks if the center track is not available.

Following the erection of the bridges, the knee braces and bayonets are put on by one gang and the signal wire crossarms, catenary attachments, such as pull-offs, steadies, etc., applied by a second gang. These parts are raised by hand line.

A special train, consisting of a locomotive, a tower car, a crane, a tool and supply car, a reel car and a caboose is used to string the main messenger. The messenger is first dead-ended and then as the train proceeds at about one mile an hour, the messenger is run off one of the reels over a roller on the end of the tool car and over a grooved wheel on the end of the crane boom. Each reel is fitted with a brake and the wire is thus given enough tension to keep it from hanging down and fouling on the track. A special roller fitting is hung from the suspension insulators, and as the crane passes each bridge the messenger is lifted by the boom so that it rests in the roller of the fitting. Without the crane, block-and-tackle would be required to raise the messenger to position. When all the cable on the reel is run out, the fall line of the crane is attached to the messenger and the messenger stressed to 12,000 lb., the tension being determined by the sag. The tension is then reduced to between 5000 and 10,000 lbs., depending on the temperature and the span lengths in the section. The roller supports are later replaced by the permanent messenger hangers.

The hangers for supporting the auxiliary messenger from the main messenger are put on by linemen riding the messenger on safety chairs. The hangers are of graded lengths and are attached in order to a 30-in. length of pipe which the man carries. He also carries a 20-ft. bamboo pole marked off in feet with which to measure the distance between hangers.

The auxiliary and the two contact wires are strung in one operation from a train consisting of a locomotive, two tower cars, a tool car, a reel car and a caboose. As the train proceeds slowly, two men on the tower cars hook triple rollers onto the hangers, one man places the auxiliary on the top roller and two men place the contact wires in the two lower rollers.



Small Tower Car for Close-Up Work, Showing Dummy Pantograph Raised

A dynamometer is used to stretch the contact wires to an initial tension of approximately 5000 lb. The wires are then slacked to their normal tension, which is between 1000 and 4000 lb. depending on the temperature. The tension on the auxiliary is between 300 and 1300 lb. depending on the temperature. Light weight, smooth underrunning splices are used for the contact wires, mechanical cone type splices for the main messenger, and a twisted sleeve connector for the auxiliary.

For securing the auxiliary to the hangers and applying the contact wire clips a train including three tower cars is used. The clips are located at the quarter points between hangers and the distance between hangers is a variable.

Small towers mounted on push cars hauled by a motor car are used for final alining, cutting in air gaps, building deflectors and general clean-up work. A feature of the small tower car is a dummy pantograph mounted on the end of the car. When it is raised against the contact wire it takes a position approximately that of a pantograph on a motor car, and a scale attached to the slide shows the height of the contact wire above the rail.

The structural steel catenary bridges were supplied by the American Bridge Company. Suspension type insulators were supplied by the Locke Insulator Company and pin type insulators by the Ohio Brass Company. All the messenger cable and half of the contact wire were furnished by the American Brass Company. The other half of the contact wire was supplied by the Bridgeport Brass Company. The bonds were made by the Ohio Brass Company and the American Steel & Wire Company.

The work is being done by railroad forces, under the direction of Mr. G. J. Ray, chief engineer; J. S. Thorp, electric traction engineer and M. H. Doughty, division engineer. Jackson & Moreland are the consulting engineers.

A View of the New Bridge Showing, in the Right Foreground, Talbot Road, Which was Relined to Pass Under the Steel Bent

Old Iron Viaduct Retired After 46 Years

Metal towers replaced by 90-ft. concrete piers in Michigan Central bridge over Kettle creek

By J. E. Bebb and L. B. Alexander
Assistant Bridge Engineers, Michigan Central, Detroit, Mich.

THE recent retirement of an old wrought-iron-viaduct of the Michigan Central's crossing of Kettle creek, just west of St. Thomas, Ont., involved the construction of a new bridge embodying some rather distinctive features. However, the project is also worthy of notice for the reason that it brings to light a particularly interesting record of railway bridge history covering a period of 56 years.

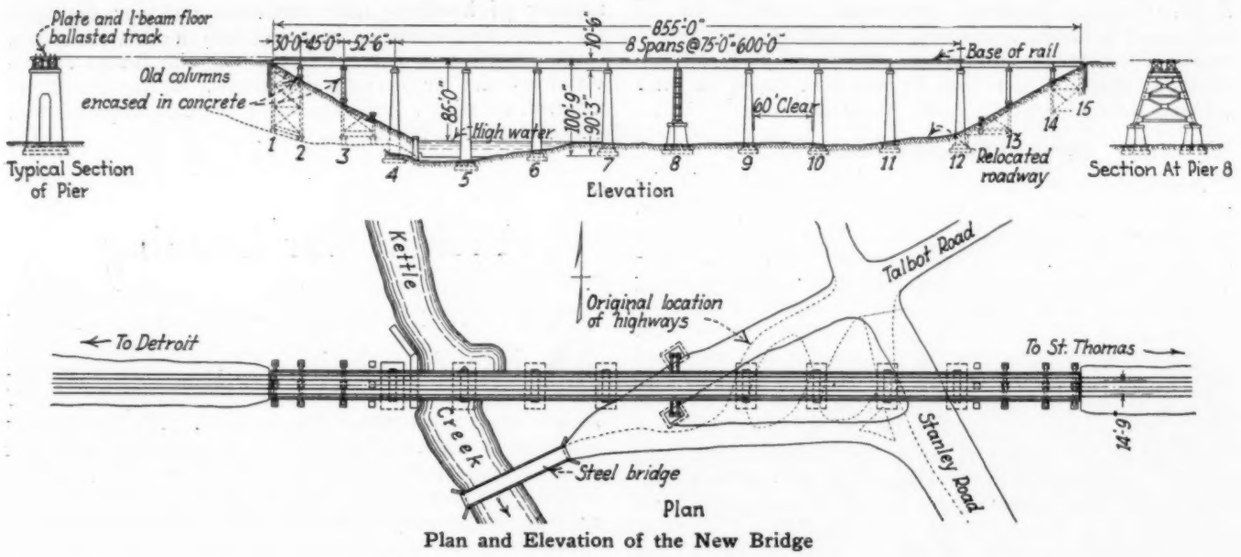
When the Canada Southern railway, now the Canada division of the Michigan Central, was built through southern Ontario in 1873, the deep wide valley of Kettle creek just west of St. Thomas was crossed by means of a timber trestle 1,402 ft. long and approximately 100 ft. high. The original structure was a single-track frame trestle with 14 Howe truss deck spans 45 ft. long in the central portion, where the structure crosses Kettle creek and two county highways that intersect just to the north of the bridge. At the time that it was built labor was cheap, timber of excellent quality was plentiful and large fills were not considered economical.

After about 10 years' service, the timber structure was replaced with a double-track, wrought-iron viaduct having 30-ft. tower spans and 45-ft. intermediate spans, with an ordinary timber deck resting upon the top flanges of the girders. The length of this viaduct was practically the same as that of the timber trestle that it replaced.

By 1902 live loads had so increased that it was decided to strengthen the existing structure. This was done by the addition of three lines of girders and columns and the replacement of the timber deck by an I-beam, steel-plate ballast floor. The structure was also shortened by filling at each end to an overall length of 855 ft. With these changes, the viaduct was made to serve without further change for 27 years, when complete replacement was found necessary. It will be noted that the wrought-iron portion had been in service 46 years.

Traffic a Factor in Choice of Design

The bridge which has just been completed is new throughout, except that three of the old bents in each bank-head were retained as support for the new superstructure, after being encased in concrete. The rest of the substructure consists, with one exception, of tall concrete piers, uniformly spaced to support a superstructure of double-track deck plate-girder spans carrying an I-beam and steel-plate floor. Eight of these spans, resting on the new piers, are 75 ft. long center to center of

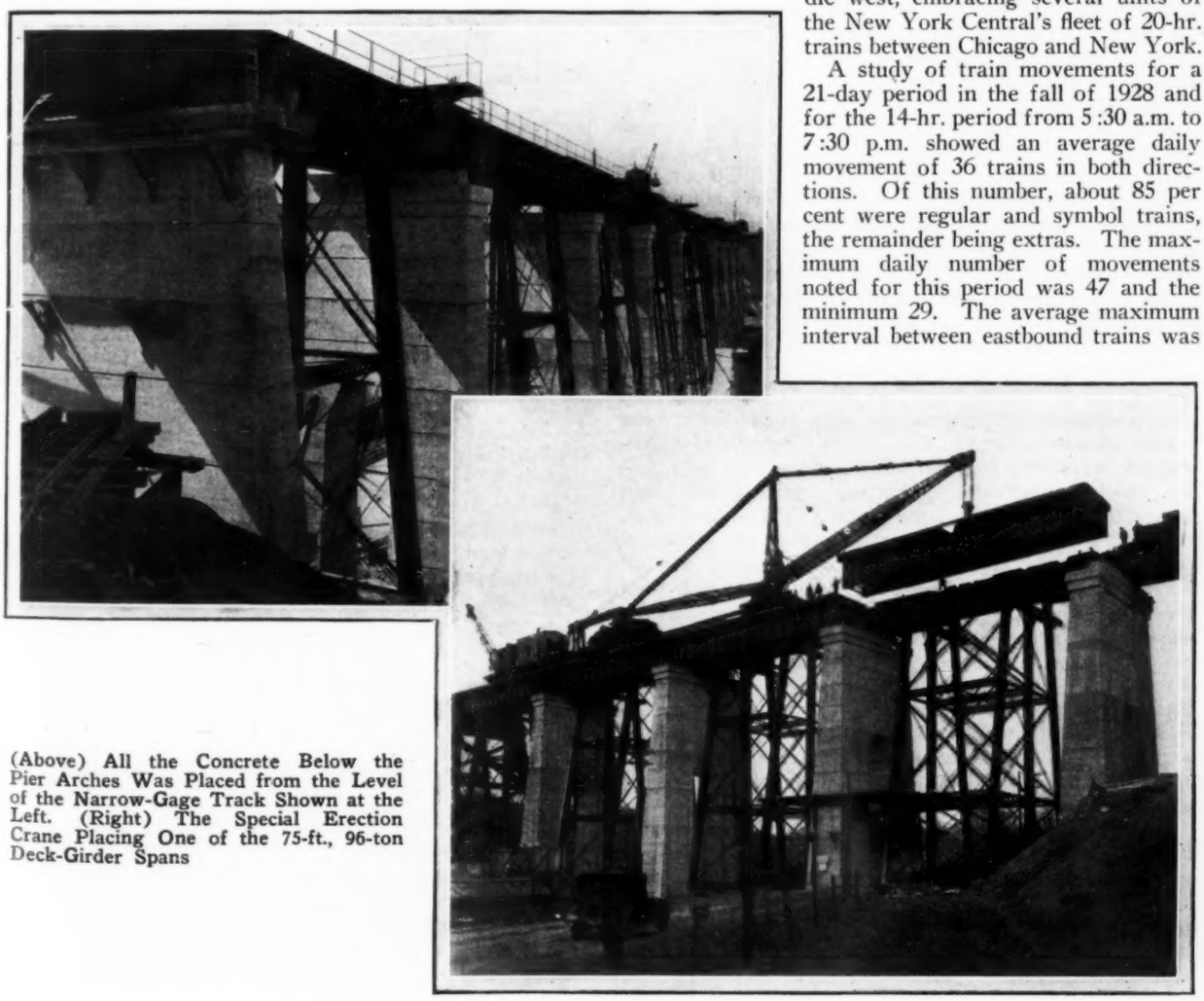


Plan and Elevation of the New Bridge

piers, while at each end, over the sloping ends of the approach embankments, there are approach spans of 52½ ft., 45 ft. and 30 ft. respectively.

The design is essentially conventional, with the exception of the great height of the piers, and the large yardage of concrete involved in their construction. It was selected, after due consideration had been given to several other designs, principally for the reason that it was adapted particularly to a program of construction that would involve little or no disturbance to traffic. The Canada division of the Michigan Central carries one of the fastest and densest train schedules in the middle west, embracing several units of the New York Central's fleet of 20-hr. trains between Chicago and New York.

A study of train movements for a 21-day period in the fall of 1928 and for the 14-hr. period from 5:30 a.m. to 7:30 p.m. showed an average daily movement of 36 trains in both directions. Of this number, about 85 per cent were regular and symbol trains, the remainder being extras. The maximum daily number of movements noted for this period was 47 and the minimum 29. The average maximum interval between eastbound trains was



(Above) All the Concrete Below the Pier Arches Was Placed from the Level of the Narrow-Gage Track Shown at the Left. (Right) The Special Erection Crane Placing One of the 75-ft., 96-ton Deck-Girder Spans

3 hr. 13 min., between westbound trains 2 hr. 15 min., and between eastbound and westbound trains 1 hr. 46 min. It was, therefore, considered of prime importance that the structure be one that could be built without interfering with train operation.

Steel Bent Spans Highway

Another unusual feature of the new viaduct is the use of a structural steel bent in lieu of a concrete pier, at the exact center of the bridge. This was introduced at the insistence of city and provincial officers to provide an uninterrupted line of sight for vehicles using an east and west highway, known as the Fingal or Talbot road, which carries quite a heavy traffic from Detroit and Windsor to St. Thomas. The posts of this bent are battered to an unusual degree so as to span a 40-ft. roadway. The bottom strut of the bent clears the roadway pavement by 21 ft. This highway approaches the viaduct in either direction on very steep grades, crossing Kettle creek about at the bottom of the west grade and intersecting a second highway, the London and Port Stanley road, near the foot of the east grade. Because of this complicated highway situation it was deemed essential in the minds of certain public officers to substitute a steel bent for one of the piers.

The general contract for the work was awarded on April 25, 1929, and work on the pier footings began at once. The mixing plant and stock piles of material were located at track level east of the viaduct and north of the tracks. For the delivery of concrete to the forms, a narrow-gage track was provided which was supported on a bench cut in the side of the embankment and on bridge timbers laid on the first tier of horizontal struts below the tops of the viaduct towers. The concrete was discharged from the mixer into bottom-dump buckets mounted upon trucks, which were then hauled by a gasoline locomotive over the narrow-gage track to a point directly over the forms. In this manner about 80 per cent of the concrete in the piers was deposited without working from the deck of the viaduct. The remainder of the concrete in the piers was handled in bottom-dump buckets from the deck of the viaduct. A total of 11,245 cu. yd. of concrete was placed in 101 days without delay to trains and while operating over both tracks of the viaduct.

Erection of Superstructure

In erecting the superstructure, each single-track span was set up near the end of the viaduct, riveted and waterproofed, with the exception of one connecting floor section which was left out so that the derrick hooks could engage the top flanges of the girder. This entire span, weighing 96 tons, was then carried out on the structure by means of a special erection crane and lowered into position on the piers. The remaining floor section was then placed and the span was ready for the stone ballast. The erection of the superstructure of the eastbound track was started on September 16, 1929, and completed on October 30. For the westbound track, erection was started on November 4 and completed on November 29. Trains operated single track over the viaduct during the erection of the superstructure. The entire work except final field painting and the hand railings was completed on January 3, 1930.

The entire project cost $689,000. The contract for the substructure and erection of the superstructure was carried out by the D. W. Thurston Company, Detroit, Mich., and the steel was fabricated by the Canadian Bridge Company, Walkerville, Ont. Much credit is due these two organizations for the rapid and satisfactory manner of handling their contracts and for the high quality of workmanship that went into the new structure.

The work was carried out under the direct supervision of the engineering department of the Michigan Central, of which J. F. Deimling is chief engineer and G. C. Tuthill is bridge engineer.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended May 31, which included a holiday, amounted to 860,249 cars, a decrease of 112,576 cars as compared with the corresponding week of last year and of 74,424 cars as compared with 1928. All commodity classifications showed reductions as compared with last year and all districts reported decreases as compared with both years except the Pocahontas, which showed an increase as compared with 1928. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, May 31, 1930

Districts	1930	1929	1928
Eastern	190,935	221,166	214,652
Allegheny	173,464	204,210	189,665
Pocahontas	50,014	56,476	49,088
Southern	122,689	137,817	138,705
Northwestern	136,768	154,600	148,376
Central Western	119,859	129,679	124,597
Southwestern	66,520	68,877	69,590
Total Western Districts	323,147	353,156	342,563
Total All Roads	860,249	972,825	934,673
Commodities			
Grain and Grain Products	35,379	37,280	33,975
Live Stock	21,191	22,467	24,889
Coal	127,547	145,083	138,983
Coke	10,160	12,322	9,854
Forest Products	50,016	66,574	64,619
Ore	58,759	73,469	60,900
Merchandise L.C.L.	215,735	231,477	230,742
Miscellaneous	341,462	384,153	370,911
May 31	860,249	972,825	934,673
May 24	931,472	1,062,088	1,021,403
May 17	930,004	1,046,594	1,003,288
May 10	933,931	1,048,960	1,002,411
May 3	942,899	1,051,935	978,053
Cumulative totals, 22 weeks	19,487,859	21,325,072	20,472,331

The freight car surplus for the period ended May 23 averaged 428,559 cars, an increase of 18,428 cars as compared with the preceding week. The total included 222,210 box cars, 146,960 coal cars, 30,068 stock cars and 16,467 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended May 31 totaled 67,745 cars, an increase over the previous week of 9,808 cars, but a decrease of 5,826 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
May 31, 1930	67,745	33,658
May 24, 1930	57,937	34,637
May 17, 1930	62,493	34,155
June 1, 1929	73,571	38,942
Cumulative Totals for Canada		
May 31, 1930	1,270,729	798,810
June 1, 1929	1,408,198	949,122
June 2, 1928	1,392,377	876,127

A WHOLE MONTH WITHOUT A REPORTABLE ACCIDENT to an employee is the record of the First Division of the Atlantic Coast Line; the month of May, about 7,800 employees and total man-hours worked aggregating 1,712,532. This is one of the three grand divisions of the Atlantic Coast Line. The mileage of the whole road is 5,155.

Railways Spent Billion and a Third Dollars For Supplies in 1929

Year's expenditures in nation's markets for fuel and other material show an increase over previous year

THE expenditures made by the Class I railways of the United States in the markets of the country for materials and supplies used in operating, maintaining and improving their properties during 1929 amounted to $1,329,535,000, according to compilations which have just been completed by the Bureau of Railway Economics from special reports made by the carriers. These expenditures are confined to the materials and supplies bought and paid for directly by Class I railways, and exclude large purchases made by contractors or builders of railway equipment and new construction, which were bought and paid for under lump sum agreements. The direct expenditures for 1929 were an increase of $58,194,000, or 4.6 per cent, over the previous year's expenditures, and, while somewhat less than similar expenditures made prior to 1927, they reflect not only the magnitude of the carrier's contribution to the business of the country, but also the continuity of the expenditures from year to year.

During the same year, capital expenditures, representing the gross expenditures for new equipment and for additions to the property, made in connection with the transportation service, amounted to $853,721,000, an increase of $177,056,000 over 1928, while capital expenditures made during the first quarter of 1930, amounting to $223,772,000, represented an increase of $96,653,000 over the corresponding quarter of 1929, and an increase of $95,344,000 over the corresponding quarter of 1928.

The purchases made by the Class I roads in 1929 and in previous years, and also the capital expenditures made both during the first quarter of this year and during previous years, are published in Tables I, II, III and IV.

Less Fuel Purchased

Total railway expenditures for fuel during 1929 amounted to $364,392,000. This was a reduction of $20,216,000, or 5.3 per cent, under 1928. Bituminous coal cost the railways $287,999,000 in 1929, anthracite coal $8,372,000, and fuel oil $62,132,000. In terms of physical units the railways in 1929 purchased 120,730,000 net tons of bituminous coal, 3,174,000 net tons of anthracite coal, and 3,004,120,000 gal. of fuel oil.

The railways purchased 23.0 per cent of the

Table I—Purchases of Material and Supplies by Class I Roads of the United States—1929

Item	1929	1928	Increase 1929 over 1928 Amount	Per cent	Per Cent of Total
Fuel:					
Bituminous coal	$287,999,000	$301,935,000	d$13,936,000	d 4.62	21.67
Anthracite coal	8,372,000	10,261,000	d 1,889,000	d18.41	0.63
Fuel oil	62,132,000	67,051,000	d 4,919,000	d 7.34	4.67
All other	5,889,000	5,361,000	528,000	9.85	0.44
Total fuel	$364,392,000	$384,608,000	d$20,216,000	d 5.26	27.41
Forest Products:					
Cross ties (treated and untreated)	$83,421,000	$95,684,000	d$12,263,000	d12.82	6.27
Switch and bridge ties (treated and untreated)	10,642,000	9,376,000	1,266,000	13.50	0.80
Timber and lumber	55,002,000	49,598,000	5,404,000	10.90	4.14
Other forest products	8,486,000	6,136,000	2,350,000	38.30	0.64
Total forest products	$157,551,000	$160,794,000	d $3,243,000	d 2.02	11.85
Iron and Steel Products:					
Steel rail (new and second-hand, except scraps)	$94,195,000	$92,181,000	$2,014,000	2.18	7.08
Wheels, axles and tires	41,269,000	39,727,000	1,542,000	3.88	3.11
Frogs, switches, crossings, track fastenings and bolts, spikes, tie plates, rail anchors, etc.	70,971,000	67,376,000	3,595,000	5.34	5.34
Iron bridges, turn tables, structural steel, bar iron, and steel, forgings, fabricated and unfabricated shapes and pressed steel parts	57,330,000	45,001,000	12,329,000	27.40	4.32
Flues and tubes for locomotives and stationary boilers	7,194,000	8,714,000	d 1,520,000	d17.44	0.54
Telegraph and telephone, interlocking and signal material	30,878,000	22,969,000	7,909,000	34.43	2.32
Bolts, nuts, washers, rivets, springs, etc.	20,272,000	18,446,000	1,826,000	9.90	1.52
Locomotive and car castings, beams, couplers, frames and car roofs	65,086,000	59,647,000	5,439,000	9.12	4.90
Machinery, boilers, repair parts and all other iron and steel products	50,645,000	43,483,000	7,162,000	16.47	3.81
Total iron and steel products	$437,840,000	$397,544,000	$40,296,000	10.14	32.94
Miscellaneous:					
Cement	$7,628,000	$6,300,000	$1,328,000	21.08	0.57
Lubricating oils and grease; illuminating oils, boiler compound; waste	24,328,000	23,968,000	360,000	1.50	1.83
Metals and metal products	57,497,000	49,826,000	7,671,000	15.40	4.32
Ballast	23,750,000	23,749,000	1,000	*	1.79
Air brake material and appliance for locomotives	25,043,000	22,112,000	2,931,000	13.26	1.88
All electrical materials	17,641,000	18,400,000	d 759,000	d 4.12	1.33
Stationery and printing	25,567,000	25,638,000	d 71,000	d 0.28	1.92
Commissary supplies for dining cars and restaurants	28,899,000	26,055,000	2,844,000	10.92	2.17
Rubber and leather goods	9,657,000	9,521,000	136,000	1.43	0.73
Painters' supplies and chemicals	35,985,000	33,794,000	2,191,000	6.48	2.71
Automotive equipment and supplies	2,545,000	2,031,000	514,000	25.31	0.19
Train and station supplies and all other miscellaneous purchases	111,212,000	87,001,000	24,211,000	27.83	8.36
Total miscellaneous	$369,752,00	$328,395,000	$41,357,000	12.59	27.80
Grand Total	$1,329,535,000	$1,271,341,000	$58,194,000	4.58	100.00

* Less than one-tenth of one per cent. d Denotes decrease.
Note: All prices include freight and handling charges.

bituminous coal output of the United States in 1929; 4.1 per cent of the total production of anthracite coal; and approximately 19.2 per cent of the production of oil processed for fuel purposes. The following table shows the ratio of direct railway fuel purchases to the production of fuel in the United States, during each of the years from 1923 to 1929:

Table II—Purchases of Fuel, Material and Supplies by Class I Railways of the United States—1923 to 1929

Item	1929	1928	1927	1926	1925	1924	1923
Fuel	$364,392,000	$384,608,000	$438,821,000	$473,354,000	$459,465,000	$471,656,000	$617,800,000
Forest Products	157,551,000	160,794,000	175,729,000	186,291,000	170,305,000	180,872,000	232,511,000
Iron and Steel Products	437,840,000	397,544,000	432,604,000	507,302,000	419,255,000	365,610,000	464,955,000
Miscellaneous	369,752,000	328,395,000	348,774,000	392,085,000	343,018,000	324,917,000	423,437,000
Grand Total	$1,329,535,000	$1,271,341,000	$1,395,928,000	$1,559,032,000	$1,392,043,000	$1,343,055,000	$1,738,703,000

Note: All prices include freight and handling charges.

Ratio of Fuel Purchases to Production

Calendar year	Bituminous coal Per cent	Anthracite coal Per cent	Fuel oil Per cent
1929	23.0	4.1	19.2
1928	24.4	4.8	18.5
1927	25.1	4.0	20.2
1926	24.4	4.4	24.0
1925	24.9	6.1	23.9
1924	26.1	5.3	25.5
1923	27.4	5.4	29.6

Forest Products

Direct purchases of forest products by the railways in 1929 amounted to $157,551,000, a decrease of $3,243,000, or 2.0 per cent, under 1928. Cross tie purchases in 1929 amounted to $83,421,000. Switch and bridge ties cost $10,642,000, timber and lumber of the total timber cut of the country would probably be above 20 per cent.

Iron and Steel Products

An outlay of $437,840,000 was made by the railways in 1929 for purchases of iron and steel products. Compared with 1928, this was an increase of $40,296,000, or 10.1 per cent. Steel rail purchases in 1929 amounted to $94,195,000. The cost of wheels, axles, and tires in 1929 amounted to $41,269,000. Purchases of frogs, switches, crossings, track fastenings, bolts, and spikes in 1929 aggregated $70,971,000. The outlay for bridges, turn tables, structural steel and the like amounted to $57,330,000. Railway purchases of steel rail in 1929 aggregated 2,138,000 gross tons. This represents a larger tonnage than in 1928 by 2.8 per cent.

Estimates place the railway use and consumption of the total iron and steel production of the United States at 17 per cent in 1929. This 17 per cent represents approximately 6,895,000 gross tons.

Table III—Quantities of Materials Purchased by Class I Railways of the United States—1923 to 1929

Item	Unit	1929	1928	1927	1926	1925	1924	1923
Bituminous coal	Net tons	120,730,000	122,380,000	130,190,000	140,084,000	129,325,000	126,372,000	154,902,000
Anthracite coal	Net tons	3,174,000	3,654,000	3,199,000	3,678,000	3,780,000	4,673,000	5,016,000
Fuel oil	Gallons	3,004,120,000	2,762,736,000	2,765,259,000	3,058,916,000	3,043,783,000	2,848,550,000	2,962,619,000
Cross ties	Number	79,336,000	88,774,000	97,135,000	93,760,000	87,965,000	98,130,000	113,907,000
Switch and bridge ties	Bd. measure—Ft.	289,215,000	258,462,000	326,735,000	365,957,000	306,444,000	329,040,000	
Timber and lumber	Bd. measure—Ft.	1,419,804,000	1,353,808,000	1,285,289,000	1,580,767,000	1,416,111,000	1,296,430,000	2,388,785,000
Steel rail	Gross tons	2,138,000	2,080,000	2,278,000	2,504,000	2,179,000	1,779,000	1,889,000
Cement	Barrels	4,069,000	3,060,000	2,673,000	3,127,000	2,104,000	2,211,000	2,416,000
Ballast	Cubic-yards	30,426,000	27,156,000	28,430,000	25,422,000	21,673,000	14,265,000	*

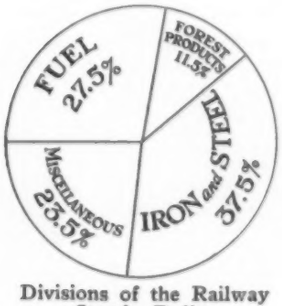
* Not reported.

$55,002,000, and other forest products $8,486,000. Compared with 1928, the number of ties purchased in 1929 by the railways decreased 10.6 per cent under 1928, the totals being 79,336,000 ties in 1929 and 88,774,000 in 1928. Switch and bridge ties in 1929 accounted for 289,215,000 board measure feet of lumber. This was an increase of 11.9 per cent over 1928. Timber and lumber purchases in 1929 amounted to 1,419,804,000 board measure feet, which was an increase of 4.9 per cent over 1928.

The railways in 1929 took directly 15.9 per cent of the total timber cut of the United States, compared

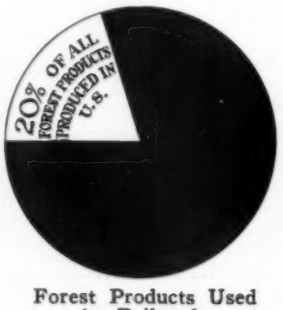
Miscellaneous Purchases

The railways spent directly for cement during 1929 a total of $7,628,000. This was an increase of $1,328,000, or 21.1 per cent, compared with 1928. An aggregate of 4,069,000 bbl. of cement was purchased by the railways in 1929. The production in the United States amounted to 172,408,000 bbl. in that year, making the direct purchases by the railways to 2.4 per cent of the total produced. In addition, they indirectly



Divisions of the Railway Supply Dollar

Railway Purchases and U. S. Production



Forest Products Used by Railroads

Iron and Steel Purchases of the Railways

utilized a great quantity of cement in construction work let out under contract.

Total purchases of lubricating oils and grease, illuminating oils, boiler compound, and waste for the year 1929 was $24,328,000, an increase of $360,000, or 1.5 per cent, over 1928.

For the various non-ferrous metal products needed in railway operation, such as brass, copper, zinc, lead, etc., the railways spent $57,497,000 in 1929. This was an increase of $7,671,000, or 15.4 per cent, over 1928.

Approximately 30,426,000 cubic yards of ballast were purchased in 1929 by the railways, which was an increase of 12.0 per cent over 1928. The total cost in 1929 was $23,750,000, approximately the same as the total cost of smaller number of cubic yards purchased in 1928.

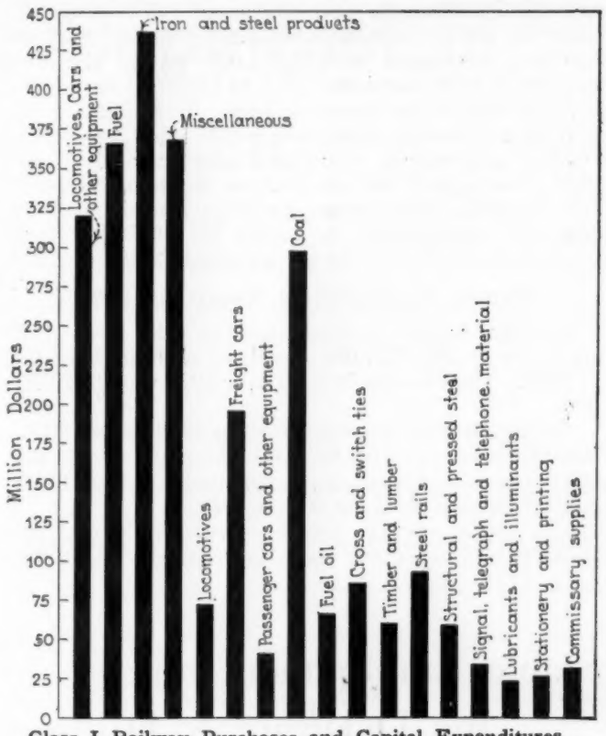
Capital Expenditures

The capital expenditures made by Class I railways during the first quarter of 1930 were published in part in the *Railway Age* of May 24 but are presented in this article in more detail, along with the complete record of annual capital expenditures made in previous years. Capital expenditures by the Class I railways, during the first quarter of 1930, amounted to $223,772,000. This represented actual gross expenditures for new equipment, and for additions and betterments to property used in connection with transportation service. This was an increase of $96,653,000 over the corresponding quarter of 1929, and an increase of $95,344,000 over 1928.

Total capital authorizations to April 1, 1930, including the carry-over from 1929, amounted to $973,578,000, compared with $704,960,000 for the same period in 1929, and $593,757,000 in 1928. This increase in authorizations for 1930 was due to increases both in carry-over from previous years and in additional authorizations made during the first quarter of the year.

Capital expenditure during the first quarter of 1930 devoted to purchase of new equipment was $89,070,000, compared with $37,642,000 for the corresponding period of 1929. While roadway and structure expenditures aggregated $134,702,000, compared with $89,477,000 in 1929.

Capital expenditures in the first quarter of 1930 for locomotives amounted to $14,408,000, compared with $10,517,000 during the corresponding quarter of 1929. For freight cars, expenditures amounted to $61,002,000, compared with $14,168,000 in 1929. For passenger cars, capital expenditures amounted to $9,602,000, compared with $10,835,000 in 1929.



Class I Railway Purchases and Capital Expenditures in 1929

Total capital expenditures by the railways for roadway and structures in the first quarter of 1930 amounted to $134,702,000. This was an increase of $45,225,000 over the corresponding quarter of 1929.

Expenditures for additional main track during the first quarter of 1930 amounted to $14,240,000, compared with $10,165,000 during the corresponding period of 1929. For yards and sidings $13,129,000 was spent during the first three months of 1930, compared with $9,921,000 spent during the same three months of 1929. Heavier rail expenditures totaled $10,323,000 in the first quarter of 1930, compared with $8,502,000 in the same period of 1929. For additional ballast $1,893,000 was expended in the quarter year of 1930 and $1,622,000 in the same quarter year of 1929.

For shops and engine houses, including machinery and tools, expenditures totaled $8,357,000 compared

Table IV—Gross Capital Expenditures, Class I Roads—1924 to 1930

Item	1929 Thousands	1928 Thousands	1927 Thousands	1926 Thousands	1925 Thousands	1924 Thousands	1930 Authorized incl. carry-over from 1929 Thousands	1930 Expenditures first quarter 1930 Thousands	1930 Carry-over unexpended authorizations Thousands
EQUIPMENT:									
Locomotives	$70,660	$51,501	$76,975	$108,263	$59,778	$102,456	$88,012	$14,400	$73,604
Freight-train cars	191,917	116,549	136,490	185,792	222,476	318,571	167,910	61,002	106,908
Passenger-train cars	38,670	41,215	53,769	58,117	41,207	53,134	48,641	9,602	39,039
Other equipment	20,059	15,036	21,466	19,750	14,653	19,448	15,596	4,058	11,538
Total—Equipment	$321,306	$224,301	$288,700	$371,922	$338,114	$493,609	$320,159	$89,070	$231,089
ROADWAY AND STRUCTURES:									
Additional track	$129,148	$116,494	$139,175	$166,758	$145,757	$116,725	$145,265	$27,369	$117,896
Heavier rail	46,862	47,192	43,742	42,184	32,952	32,037	47,903	10,323	37,580
Additional ballast	17,049	15,748	16,230	16,520	11,665	10,825	12,860	1,893	10,967
Shops and enginehouses	36,561	24,324	35,236	46,882	31,345	39,834	30,797	8,357	22,440
All other improvements	302,795	248,606	248,469	240,820	188,358	181,714	416,594	86,760	329,834
Total—Roadway and Structures	$532,415	$452,364	$482,852	$513,164	$410,077	$381,135	$653,419	$134,702	$518,717
Grand Total	$853,721	$676,665	$771,552	$885,086	$748,191	$874,744	$973,578	$223,772	$749,806

Note: Additional track includes rail and tie fastenings and other track material. Shops and enginehouses include machinery and tools.

with $5,479,000 in the first quarter of 1929. Expenditures for station and office buildings, and other station facilities, amounted to $22,751,000 during the first quarter of 1930, compared with $11,607,000 during the same period of the previous year. Expenditures for bridges, trestles and culverts were $17,156,000 and $12,572,000, respectively, in the first quarters of 1930 and 1929. For signals and interlockers, including telegraph and telephone lines, automatic train control, etc., the quarter's expenditures amounted to $9,516,000 compared with $5,199,000 during the same period of 1929.

Capital Expenditures, Years 1928-1929

Railway capital expenditures for the year 1929 amounted to $853,721,000 compared with $676,665,000 in 1928. The increase in 1929 over 1928 was $177,056,000.

The expenditure for equipment in 1929 totaled $321,306,000, compared with $224,301,000 in 1928 while that for roadway and structures amounted to $532,415,000 in 1929, against $452,364,000 in 1928.

The annual average for the seven-year period was $838,444,000, while the daily average was $2,297,000.

Stable Employment on the Delaware & Hudson

L. F. LOREE, president of the Delaware & Hudson in a recent address before the National Metal Trades Association in New York City, giving an account of that road's unique activities for the welfare of its employees during the past ten years, said that with the elastic work day and other improvements, the labor turnover had been reduced 78.2 per cent (and in the maintenance of way department 88.2 per cent); and the depression of the last six months has been weathered without any man losing his job. The piece-work system gives men in the machine shop 96 cents an hour as against the hourly rate of 76.6 cents; and in the car shops 99 cents against 69.4 cents. Working conditions have been greatly improved and the company has aided in the organization of recreation and health activities. The whole plan of stabilization is highly appreciated, and is very popular. Several emergencies have been passed through successfully, the men voluntarily submitting to a five-day week, of eight hours a day, on two occasions.

Continuing, Mr. Loree said. "The Company has endeavored to secure to its employees a considerable measure of protection against the five major hazards of life; that is, against sickness, accident, unemployment, superannuation, and death. On May 1, 1922, we had instituted a group insurance plan. The health, accident, and disability premiums are paid by the employees; the life insurance premiums are about equally divided. Under this group insurance plan, a total of more than $2,400,000 has been paid to employees or their families at the time when most needed. A pension plan which had been in effect for years, the entire expense of which was borne by the company, was continued. So confident did we feel of being able to maintain satisfactory relations with our men that we instituted a plan of unemployment insurance, defining unemployment as a case of a man having to seek a new employer because of our no longer needing his services or because of discharge for his own misconduct.

"Under the plan all employees completing six months' service are given free insurance against death or total and permanent disability to the amount of $250, and they may subscribe to $250 additional insurance. Upon the completion of two years' continuous service the amount of free insurance is automatically increased to $500 and employees become eligible for full participation in all of the benefits afforded. Employees so qualifying are offered the opportunity to subscribe to any or all of three classes of additional insurance covering (a) accident and accidental death and dismemberment. Employees subscribing for at least two or three of these kinds of additional insurance are automatically insured, at the company's expense, against unemployment. Employees furloughed and those granted leaves of absence are protected by insurance for a period of four months. In addition under the plan the company voluntarily pays all premiums on life insurance carried after retirement from active service by any employee placed on the pension roll.

"During the year 1929, the eighth year in which this full coverage has been in operation, payments to employees have been as follows:

163	Death claims	$274,514.27	
1,202	Health claims	115,308.00	
131	Accident claims	10,268.81	
16	Accidental death and dismemberment claims	22,600.00	
7	Total and permanent disability claims	7,022.56	
60	Unemployment claims	4,765.00	
11	Incapacitated payroll	10,795.50	
292	Pensions	176,854.99	
	Total		$622,129.13
	The contribution of the company was	$353,795.09	
	The contribution of the employees was	325,050.39	
	Total		$678,845.48

The difference represents the cost of carrying the insurance.

"The latest study, made in May, 1929, indicated losses in the full working time of the previous year by sickness of 2.7 per cent; by accidents, 0.3 per cent; by vacations, 1.4 per cent; by leaves of absence, 2.7 per cent; or a total of 7.1 per cent, a loss greater than the total effect of the minor depressions, and equal to about one-third of the most violent depressions. Leaves of absence which, with vacations, are entirely within the control of the employee, were 4.1 per cent; while sickness and accidents lost 3.0 per cent of the time. That is, for the group the voluntary idleness was more than the involuntary idleness.

"While we have not as yet achieved complete success, we believe that our policy in whole or in part can be applied to other industries. Either from the business or the human aspect, this relation of employer and employee affords great opportunities and promises great rewards to the efforts of the management."

* * *

Erecting a 101-Ton Girder, 112½ ft. Long, in a Grade Separation Structure on the Union Pacific at Wineville, Cal.

Five Years' Developments in Locomotive Service

Factors which have reduced maintenance costs and improved performance on the Chicago, Milwaukee, St. Paul & Pacific

By R. W. Anderson

Superintendent of Motive Power, C., M., St. P. & P.

TEN years ago the Locomotive Department of the Chicago, Milwaukee, St. Paul & Pacific adopted the payroll allotment system of governing expenses. After the advantages and merits of this system had been demonstrated, the desirability of extending the allotment to cover cost of material as well as payroll was recognized and since June, 1926, allotments covering locomotive repairs, labor and material, and a separate allotment for other payroll expenses in the department, have been issued.

Estimates for the budget are compiled semi-annually. The estimates are arrived at by analyzing the maintenance program, from which the approximate cost per locomotive mile can be determined by reference to data set up over a period of preceding years. Business prospects are taken into consideration and, if there apparently will be about the same amount of traffic as in the preceding year, the amount of allotment for locomotive maintenance is based on the mileage run during the same six-month period the previous year. If there are indications of an increase or decrease in business, adjustments are made in the estimated mileage which automatically adjusts the estimated cost.

Estimated cost of work-equipment maintenance is based on similar costs over a period of years, this item of expense being relatively small when compared with the major items of expense. The allotment for enginehouse expense and items other than maintenance of equipment is based on previous periods after taking into consideration any changes in the operation such as additional extended locomotive runs, improved facilities and apparent variations in traffic conditions.

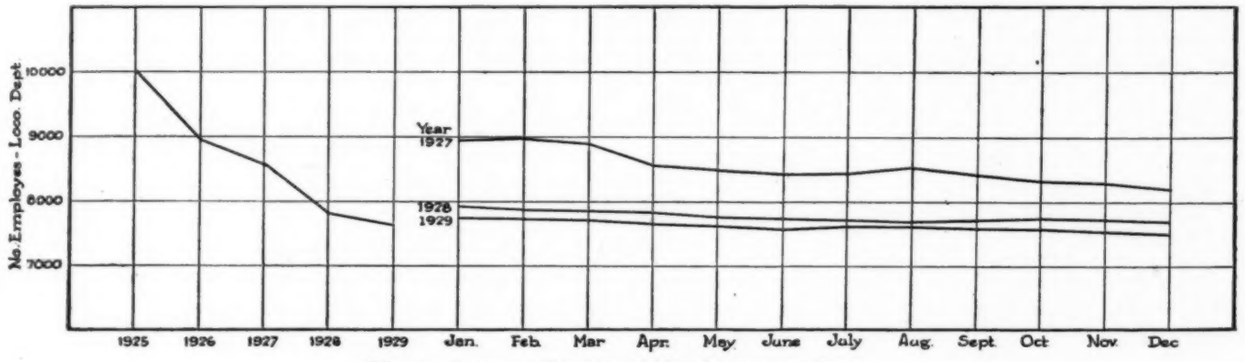


Fig. 1—Average Number of Employees per Year

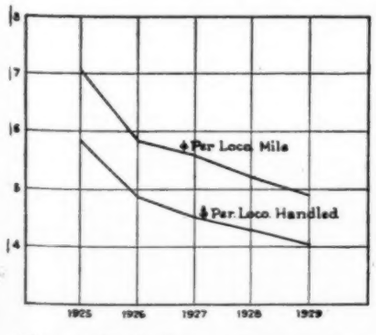


Fig. 2—Enginehouse Expense in Cents per Mile Run and Dollars per Locomotive Handled

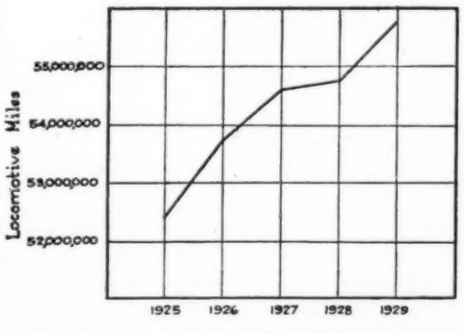


Fig. 3—Total Locomotive Miles Run

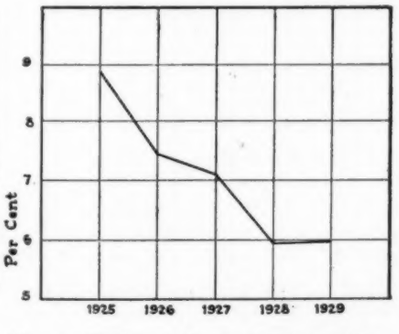


Fig. 4—Ratio of Cost of Locomotive Repairs to Total Operating Revenue

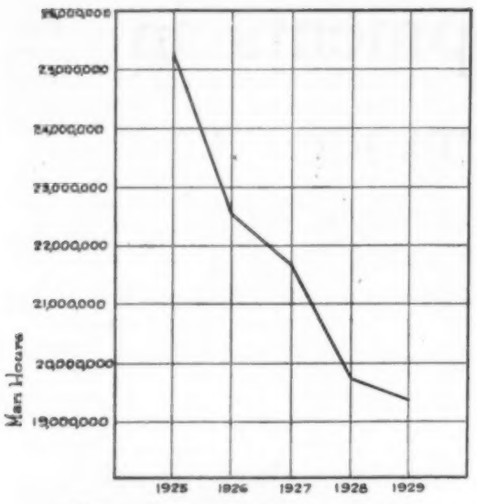


Fig. 5—Total Man-Hours per Year

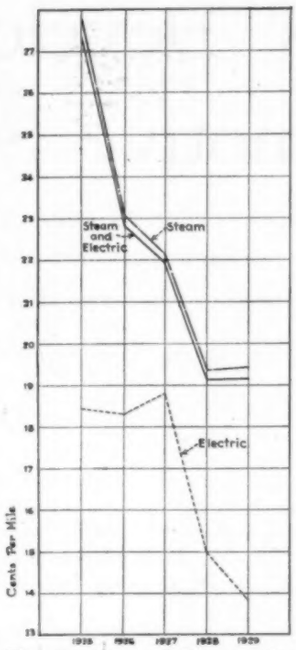


Fig. 6—Cost of Locomotive Repairs in Cents per Mile

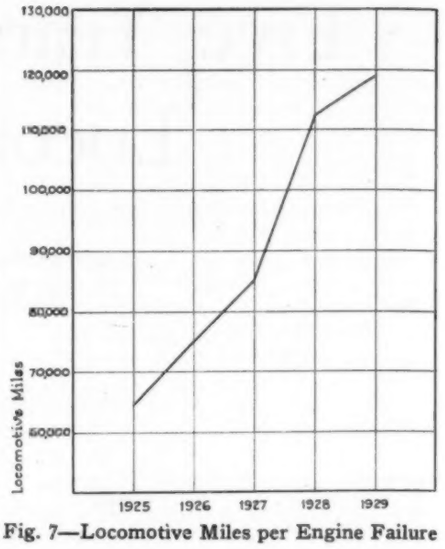


Fig. 7—Locomotive Miles per Engine Failure

Estimates of cost of material are based on the ratio of material to labor, this ratio for steam locomotives being material 40 per cent, labor 60 per cent, and for electric locomotives, material 42 per cent, labor 58 per cent, since the increase granted shop me April 1, 1929. Allotments are assigned monthly to each shop and division. Keen competition in controlling costs has developed between the different shops and the different divisions, each organization unit striving to maintain the locomotives in the best physical condition and control its shop output or complete a successful operation with as small an expenditure as possible.

Each shop reports its payroll expenditure four times each month. Each division reports its payroll expenditure and locomotive mileage for the same periods. With this information, the superintendent of motive power can determine the trend of business and expenses and, if something unusual or unforeseen occurs, can adjust expenses to meet conditions within a period of a few days.

Modern shop equipment and other facilities have done much to lower expenses. During the past three years, new tools and other equipment have been installed to take the place of obsolete facilities with the result that production has been increased. This feature is given consideration when the budget for a subsequent period is being developed.

In working out the program in the locomotive department, the practicability of stabilized forces has

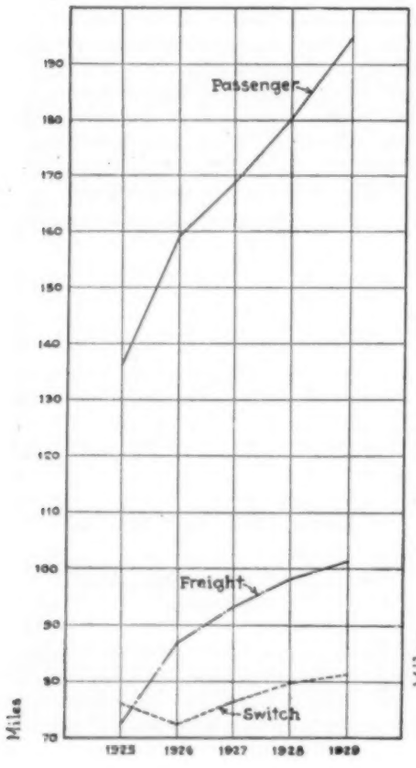
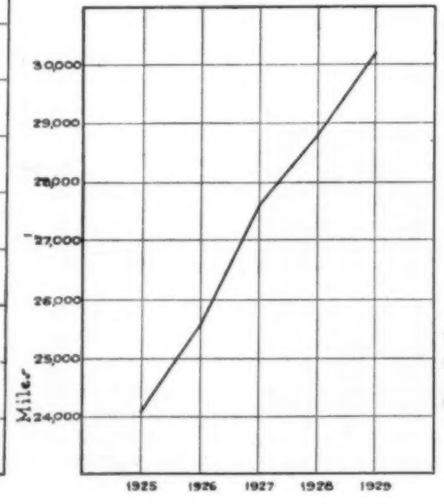
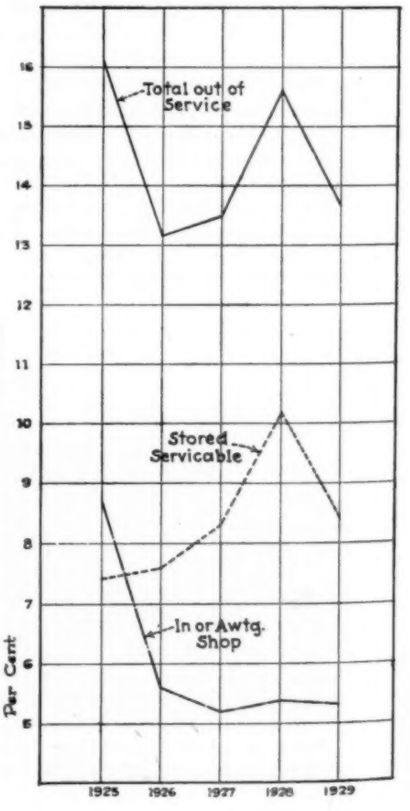


Fig. 8—(Left) Locomotive Miles per Active Locomotive Day

Fig. 9—(Below) Average Locomotive Miles per Year per Locomotive Owned

Fig. 10—(Right) Locomotives Out of Service, Stored Serviceable and In or Awaiting Shop





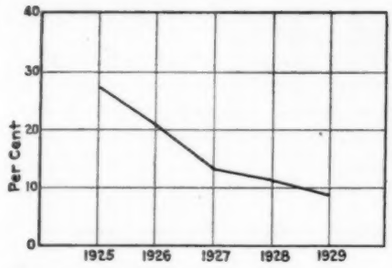


Fig. 11—Per Cent of Locomotives Inspected by Federal Inspectors Found Defective

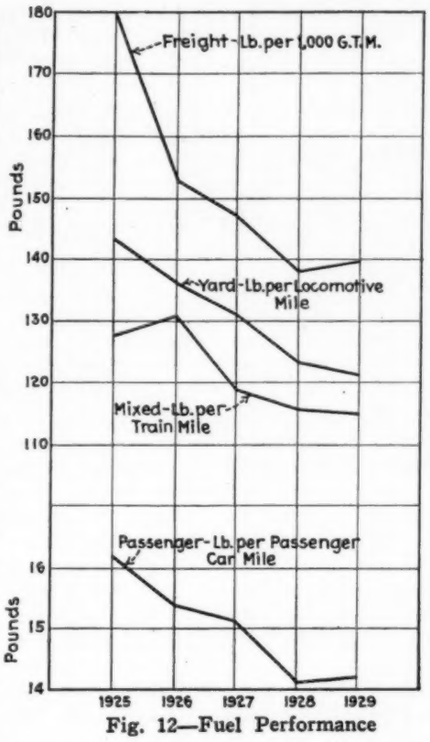


Fig. 12—Fuel Performance

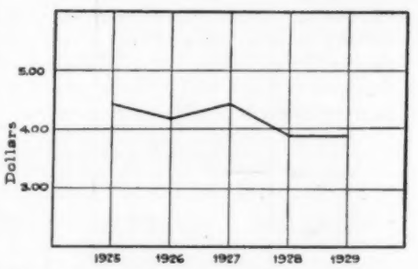


Fig. 13—Cost of Locomotive Lubrication per 1,000 Locomotive Miles

been acknowledged and it has been the endeavor to provide steady employment for a constant force so far as conditions will permit.

The drawings illustrate what has been accomplished during the five-year period from January 1, 1925, to December 31, 1929. Fig. 1 pictures the total number of employees in the locomotive department of the five-year period and also the stability of forces for the years 1927, 1928 and 1929. In 1925 there was an average of 10,009 employees and in 1929 an average of 7,639, a reduction of 23.68 per cent. Fig. 5 illustrates the man hours worked, the total in 1925 being 23,342,329 and in 1929, 19,321,288, a reduction of 23.76 per cent. During 1927 and 1928 tender-repair and pattern-shop forces, which were formerly on the car-department payroll, were taken over by the locomotive department and are included in the total number of locomotive department employees after being transferred. These transfers caused slight distortions in the employment curves for these two years. Fig. 6 represents the cost per mile for locomotive repairs. The average cost per mile in 1925 for steam and electric was 27.31 cents and in 1929 it was 19.14 cents, a reduction of 29.92 per cent.

Fig. 7 portrays the miles per engine failure, which were 64,290 in 1925 and 118,983 in 1929, an increase of 85.07 per cent. The Milwaukee definition of an engine failure is as follows: "A delay of more than two minutes to a passenger train, five minutes to a freight train, or thirty minutes to a switch crew, when caused by defective condition of engines, will constitute a failure." In addition, it is the rule that time made up after a failure occurs does not cancel the failure.

Fig. 2 shows the cost in cents per locomotive mile and dollars per locomotive handled for enginehouse expense. In 1925 the cost per locomotive mile was 7.08 cents and in 1929 it was 4.9 cents, a reduction of 30.79 per cent. The cost per locomotive handled has been reduced from $5.81 in 1925 to $4.05 in 1929, or 30.29 per cent. Fig. 3 indicates the total locomotive mileage, increasing from 52,396,044 miles in 1925 to 55,802,852 in 1929, or 6.5 per cent. Fig. 4 exhibits the ratio of the cost of locomotive repairs to total operating revenue with a downward trend from 8.82 in 1925 to 5.98 in 1929, or a reduction of 32.28 per cent.

Fig. 8 describes the performance so far as locomotive miles per active locomotive day is concerned, the increase in passenger service being from 136.1 miles in 1925 to 195.1 in 1929, or 43.35 per cent. In freight service the increase was from 72.5 miles to 101.5, or 40 per cent, and in switching service, from 76.1 to 81.0, or 6.44 per cent. Fig. 9 shows the average locomotive miles per year per locomotive owned, an increase from 24,035 to 30,196 miles, or 25.63 per cent.

In Fig. 10 is shown the per cent of locomotives in or awaiting shop, the per cent stored serviceable and the total per cent out of service from these two causes at the end of each year. Attention is called to the curve representing the locomotives in and awaiting shop which, at the end of each of the past three years, has not varied more than two-tenths of one per cent. This chart indicates that the favorable trend in the cost of locomotive repairs has not been accomplished through deferred maintenance. Another feature, which is a testimonial as to the condition of locomotives, is illustrated in Fig. 11, which shows the per cent of locomotives inspected by Federal Inspectors found defective. In 1925 the percentage was 27.4 and in 1929 it was 9.3.

Fuel Performance and Lubrication

Fig. 12 shows the trend of the fuel performance in the different classes of service. The slight increase in freight and passenger service in 1929 was due to exceptionally bad weather conditions during the first three months of the year together with the month of December, during which time the consumption of fuel was excessive. The performance for the other months of the year showed an improvement over the same period in previous years.

Fig. 13 is representative of the cost of locomotive lubrication per one thousand locomotive miles, this cost in 1925 being $4.44 and in 1929, $3.93, a reduction of 11.49 per cent.

There are several features which have contributed to the favorable trends illustrated by the charts, ranking in importance as follows: An effective organization augmented by a stable administration of sound policies and efficient practices, extended locomotive runs, modernized and improved facilities in shops and roundhouses and improvement in quality of boiler feedwater.

Extended locomotive runs have made possible economies in enginehouse expense, locomotive fuel consumption and locomotive maintenance. Less frequent turning and servicing has had its economical effect on enginehouse expense by eliminating intermediate terminals without increasing materially the costs at final terminals. Fuel economies are effected on coal-burning locomotives by less frequent knocking and building

of fires. Locomotive maintenance has benefitted by having a less number of locomotives in service and, as the units in service are cooled off and fired up less frequently, the bad effects of expansion and contraction in firebox sheets and flues have been reduced.

Extended Locomotive Runs

In 1922 the campaign for extended runs was inaugurated by running the passenger locomotives between Milwaukee, Wis., and Minneapolis, Minn., a distance of 335.8 miles. The former practice was to change engines at La Crosse, Wis., which is 195.8 miles from Milwaukee and 140 miles from Minneapolis. During that same year through passenger runs between Savanna, Ill., and Omaha, Neb., were established, the distance being 349.5 miles whereas prior to that time the locomotives were changed at Perry, Ia., 223.5 miles from Savanna and 126 miles from Omaha. A short time thereafter locomotives were run from Minneapolis to Mobridge, S. D., a distance of 383.8 miles, the former practice having been to change engines at Montevideo, Minn., a distance of 133 miles from Minneapolis, and at Aberdeen, S. D., a distance of 152.6 miles from Montevideo and 98.2 miles from Mobridge. Recently continuous passenger locomotive runs between Aberdeen, S. D., and Manilla, Ia., a distance of 355.6 miles, were inaugurated.

The establishment of these through runs demonstrated the practicability of longer locomotive runs as well as the benefits to be derived therefrom. As soon as wayside facilities made longer runs feasible no time was lost in extending the runs. This practice now exists on practically every division on the railroad, the longest run at present being from Mobridge, S. D., to Harlowton, Mont., a distance of 530.6 miles, where formerly locomotives were changed at Marmarth, N. D., 190 miles from Mobridge and at Miles City, Mont., 122.9 miles from Marmarth and 217.7 miles from Harlowton.

Passenger service on these divisions was handled by Pacific type locomotives of which there was a scarcity prior to the introduction of extended locomotive runs. However, the lengthening of passenger-locomotive runs where these locomotives were assigned resulted in a surplus of these locomotives which were transferred to the Superior, the Iowa and Dakota, the Sioux City and Dakota, the Madison and the Racine and Southwestern divisions, releasing superheated locomotives of the 4-6-0 type that were hauling passenger trains, which in turn released saturated locomotives of the 4-6-0 type in freight service which were set aside.

In the early part of this year one 4-8-4 type and fourteen 4-6-4 type locomotives were bought for passenger service between Chicago and Harlowton, Mont. The majority of them are running between Chicago and Minneapolis, a distance of 420.8 miles, while some are assigned to run between Minneapolis and Harlowton, Mont., a distance of 914.4 miles. The new passenger locomotives have released Pacific type locomotives which have been assigned to freight service on the Sioux City and Dakota, the Hastings and Dakota, the Iowa and Minnesota, and the Madison divisions and to helper service out of Milwaukee. This latter assignment will also serve as a protection during periods when an abnormal passenger traffic prevails such as during holiday seasons, the football season, etc., when additional passenger power is required. These engines are equipped with train control which is a necessary equipment on the La Crosse and River divisions in the Chicago-Minneapolis territory and can readily be withdrawn from helper service and placed in passenger service when the traffic demands.

In addition to the new passenger locomotives making possible longer locomotive runs, the necessity for doubleheading heavy passenger trains between St. Paul and Minneapolis and using helper engines on the heavy grades on the Hastings and Dakota division has been eliminated.

Extended Freight Runs

Progress has also been made in extending locomotive runs in freight service. Freight locomotives are run from Davenport, Ia., to Kansas City, Mo., a distance of 310.6 miles, which formerly were changed at Ottumwa, Ia., 107.4 miles from Davenport and at Laredo, Mo., 104.7 miles from Ottumwa and 98.5 miles from Kansas City.

Freight engines are also operating in continuous service between Minneapolis and Mobridge, S. D., a distance of 383.8 miles and between Mobridge and Harlowton, a distance of 530.6 miles. In addition there are several continuous freight-locomotive runs where the distance run is 200 miles or more.

On the Idaho division, where oil-burning locomotives of the 2-6-6-2 type are used in freight service, the maintenance terminal is located at Othello, Wash. These locomotives are run from Othello to Avery, Idaho, via Malden, Wash., are turned at Avery and go to Spokane, from there to Manito, Wash., thence to Metaline Falls, Wash., are turned and sent back to Avery from which point they return to Othello and are given roundhouse attention, after having made slightly more than 900 miles. These locomotives fill the gap between the electrification on the Coast division and the electrification on the Rocky Mountain division. Prior to about a year ago, this service was handled by superheated compound locomotives of the 2-6-6-2 type. These were hardly large enough to handle the tonnage delivered to the Idaho division by the electric locomotives. Saturated compound locomotives of the 2-6-6-2 type were redesigned as single-expansion superheated articulated locomotives. The compound locomotives have a tractive force of 70,396 lb. and the redesigned locomotives have a tractive form of 82,720 lb., and with the additional tractive force of 12,324 lb. this steam-operated division will be able to handle the tonnage delivered by the electrification without breaking up or reducing the trains.

Experience has demonstrated that the more extensively power is utilized, the more economical will be the operation. To get the most out of locomotives and care for them properly, hot-water boiler-washing plants are essential and properly treated boiler feedwater is an important factor. In some instances treated water has made extended locomotive runs possible, and extended runs have made possible the centralizing of boiler-washing, as well as repair facilities, confining expenditures for modern equipment to a few instead of many terminals, eliminating intermediate terminals and the expense that goes with them.

A SLOT-MACHINE WHICH SELLS INSURANCE has recently been perfected by an inventor in Munich (Germany), according to British press reports. When the required premium is inserted and a finger pressed on a special roll, a receipt is received giving the date and time of issue and amount of insurance. The finger-print is recorded on a copy of this receipt printed and retained inside the machine, to avoid any possibility of mis-use or fraud. It is planned to install such machines at the principal German railroad stations.

Supplies for Maintenance of Way on the Santa Fe

Railways Keep Inventories Under Control

Railway Age summary shows halt in pruning of unapplied material following business depression, but increase avoided—Roads' turnover compared

THE Class I railroads of the United States had approximately 472 million dollars tied up in unapplied materials and supplies at the close of 1929, according to an analysis which has been made by the *Railway Age* of 117 carriers operating 163,000 miles of road, or 96 per cent of the Class I mileage in the country. This is practically the same as the quantity on hand at the close of the previous year and reflects a halt in the general downward trend of inventories for several years, but is not unexpected, in view of the slackening in business last fall and the effect of the corresponding reduction in the use of supplies to swell the volume of unapplied material, by reason of the accumulations of materials contracted for when normal consumption prevailed.

The inventories comprise the book values of materials for supplies, filed with the Interstate Commerce Commission under general balance sheet account 716. They do not necessarily embrace certain quantities of unapplied materials belonging to the railroads which may be in the possession of contractors or specially bought and segregated for large construction projects carried on independently of railway operations; also comprising a financial, rather than a physical statement, they may embrace book values of such material as scrap or retired equipment not having any value for operating purposes. The different ways in which various railways interpret the rules governing the preparation of these reports also impairs their value somewhat as an absolutely accurate and uniform measure of the volume of material awaiting use on railways, but comprising as they do the reports prepared by all roads in obedience to a common rule and sworn to, they are the most authoritative statement of railway stores available.

Reductions on 58 Roads

An analysis of the reports shows that 57 roads effected reductions in their stocks of unapplied materials, aggregating approximately $18,800,000, but that these reductions from the inventories of the previous year were offset by increases on 55 other roads in the approximate amount of $17,900,000, with the result that the total balance reported by 117 carriers, $467,-

Table I—Unapplied Material on Class I Railways—1916 to 1929, incl.

Year	Stocks on Hand End of Year	Decrease from Previous Year
1916	$323,556,387	$ .....
1917	502,986,042	+179,429,655
1918	630,207,210	+127,221,168
1919	597,573,735	35,633,475
1920	755,563,278	+157,989,543
1921	665,147,099	99,415,179
1922	546,284,853	118,862,246
1923	682,725,812	+136,440,959
1924	560,048,899	122,676,913
1925	525,853,107	34,195,792
1926	551,694,794	+ 25,841,689
1927	523,650,986	28,043,808
1928	471,077,760	52,573,226
1928*	$468,482,452	$ .....
1929*	467,584,410	898,042
1929**	471,118,417	+ 40,657

* Total for roads reported in Table II in both 1928 and 1929. Subject to revision.

** Includes roads in Table II (not switching companies) reported in 1929 only. Subject to revision as the total balance of all roads for 1929.

Note: The plus sign (+) opposite figures in third column signifies an increase.

Table II—Materials and Supplies Used and Carried by Class I Roads in 1929

Road	Fuel			Ties			Rail—All Kinds			Other Material—Less Scrap			Total Material				Ratio to Op. Exp.	
	On Hand Dec. 31	Used 12 Mos.	Days' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Report to I. C. C.	Used 12 Mos.	Months' Supply	Reduction	1929	1928
Akron, Canton & Youngstown	$1,547	$142,454	4	$20,965	$153,229	1.6	$11,624	$57,887	2.4	$133,166	$402,185	4.0	$172,440	$769,960	2.7	$33,173	7.8	8.9
Ann Arbor	12,209	572,069	1	174,288	156,069	13.5	41,965	77,776	6.5	341,715	672,782	6.0	570,178	1,478,699	4.6	+97,952	12.4	10.6
A., T. & S. Fe Lines	3,109,339	21,004,518	53	8,109,117	5,730,586	12.5	5,431,901	8,390,090	7.8	12,934,805	43,535,106	3.6	29,731,383	78,660,301	4.5	35,998	16.7	17.4
Atlanta & West Point Lines	16,560	350,510	17	90,541	111,986	9.7	67,290	83,630	9.7	601,176	818,522	9.3	775,568	1,364,650	6.8	41,800	16.1	17.0
Atlanta, Birmingham & Coast	34,207	336,677	36	188,817	272,346	8.2	41,623	37,601	13.2	301,691	963,901	3.7	595,526	1,610,527	4.4	+5,816	12.8	12.8
Atlantic Coast Line	978,146	4,188,721	9	972,197	1,803,115	6.5	1,300,945	265,489	59.5	2,987,868	4,484,437	8.0	6,386,742	14,741,764	5.1	225,427	11.9	11.8
Baltimore & Ohio	260,679			4,966,041			200,707			10,897,819			18,095,072			59,314	10.0	10.6
Bangor & Aroostook	143,665	552,545	91	229,218	182,820	15.1	72,233	243,342	3.5	599,420	793,625	9.0	1,044,536	1,772,332	7.1	+124,888	19.5	18.5
Belt Railway of Chicago	31,056	923,557	12	105,091	120,535	10.5	55,782	173,476	3.8	229,803	525,745	1.7	417,696	1,744,461	2.8		7.4	
Bessemer & Lake Erie													700,424			+145,154	7.2	6.0
Boston & Albany	117,635	3,208,957	13	316,924	600,421	6.3	78,362	557,209	1.7	1,192,246	4,932,517	2.9	1,705,167	9,299,106	2.5		7.7	
Boston & Maine	240,582	5,562,617	16	1,825,707	2,050,866	10.5	687,051	2,195,213	3.7	4,317,620	11,086,853	4.8	7,070,951	20,795,551	4.1	+594,256	11.9	11.3
Buffalo & Susquehanna	1,672	106,014	6	34,916	100,079	4.2	8,396	76,931	1.3	160,566	483,100	4.0	215,884	834,302	3.1	+22,971	13.3	13.1
Buffalo, Roch. & Pittsburgh	12,390	1,057,191	5	120,711	232,306	6.2	92,647	214,868	5.2	1,209,639	4,017,851	3.6	1,486,779	5,522,218	3.2	+106,744	10.2	10.1
Central of Georgia	73,885	1,507,706	18	204,847	492,882	5.0	339,720	486,125	8.4	890,885	2,802,279	3.7	1,544,190	5,721,071	3.2	140,692	8.1	8.8
Central of New Jersey	174,681	4,426,232	14	375,710	654,739	6.9	124,181	1,051,402	1.4	2,007,412	9,645,495	2.5	2,740,476	16,916,133	1.9	583,901	6.5	7.7
Central Vermont													570,292			56,560	8.2	
Chesapeake & Ohio	91,658	4,077,968	8	483,351	1,497,126	3.9	141,255	3,842,589	0.4	3,024,071	17,635,048	2.0	3,740,336	27,052,732	1.7	62,279	4.4	4.6
Chicago & Alton	40,339	1,839,847	8	68,151	438,360	1.8	322,337	684,240	5.7	800,520	4,917,242	1.9	1,295,595	7,879,690	1.9	+62,502	5.8	5.4
Chicago & Eastern Illinois	58,943	1,552,702	14	290,601	345,559	10.1	78,570	835,986	1.1	759,289	3,551,847	2.5	1,232,011	6,781,357	2.2	+32,004	6.3	6.2
Chicago & Illinois Midland	1,511	129,168	4	5,354	99,207	0.7	31,330	141,700	2.7	196,310	557,003	4.2	241,276	946,904	3.1	+12,131	10.2	10.7
Chicago & North Western	554,352	9,725,928	21	3,807,652	3,079,493	14.8	1,245,521	776,102	19.5	6,077,102	14,028,310	5.1	11,684,629	27,609,835	5.1	379,755	10.1	10.3
Chicago, Burlington & Q	580,453	9,715,613	21	3,248,317	3,244,416	12.0	994,707	5,457,406	2.2	8,854,211	35,024,381	3.2	14,585,715	53,441,818	3.3	+30,289	13.0	12.7
Chicago Great Western	71,090	2,317,743	11	11,642	467,821	0.3	45,355	498,612	1.1	918,723	3,133,598	3.5	1,046,810	6,417,774	2.0	114,077	5.2	6.0
Chicago, Indian. & Louis	20,260	840,195	9	218,949	194,561	13.5	196,645	342,346	6.9	681,563	3,080,144	2.6	1,188,744	4,457,246	3.2	+13,805	9.2	8.9
Chicago, Mil., St. P. & P.	600,474	10,894,720	20	2,516,518	5,154,857	5.8	2,062,157	4,893,817	5.1	8,219,269	22,790,736	4.3	13,925,510	46,047,034	3.6	+1,053,372	10.8	10.2
Chicago, R. I. & P. Lines	638,875	10,405,973	29	2,166,341	2,519,619	10.3	389,317	3,543,001	1.3	5,446,772	25,205,009	2.6	8,841,307	41,673,704	2.5	9,600	8.2	8.5
Chicago, St. P., Minn. & O.													2,056,464			562,227	9.3	11.3
Cincinnati Northern													258,413			34,247	10.0	
Cleveland, C., C. & St. L	581,424	6,690,045	32	984,748	1,263,414	9.3	810,939	1,524,186	6.5	4,031,442	12,331,071	3.6	6,439,255	21,808,717	3.5	+41,503	9.2	9.5
Clinchfield	5,035	271,168	7	51,335	245,931	2.5	144,672	97,637	17.5	394,332	306,843	15.5	677,726	921,581	9.0	178,046	15.6	20.2
Colorado & Southern	49,687	939,282	19	122,540	289,077	5.1	301,312	676,390	5.4	567,346	2,070,840	3.3	1,062,100	3,975,591	3.2	+156,014	11.6	9.9
Columbus & Greenville	1,897	122,035	7	14,845	131,374	1.4	8,073	1,479	65.5	166,122	294,417	6.8	190,140	549,308	4.1	+7,275	13.1	12.2
Delaware & Hudson	1,048,262	3,514,348	108	705,176	982,185	8.6	385,100	745,190	6.2	1,566,113	6,621,300	2.8	3,719,625	11,970,598	3.7	460,759	11.5	13.2
Del., Lack. & Western	152,878	6,641,550	8	571,320	514,254	13.3	211,067	1,268,524	2.0	1,980,273	11,083,494	2.1	2,915,538	19,507,822	1.2	+85,005	5.0	4.9
Denver & Rio Grande Wn	80,957	1,785,504	16	715,977	1,055,858	8.1	357,360	263,845	16.5	2,057,349			3,311,645	3,326,942	1.2	+124,350	13.5	13.0
Denver & Salt Lake													401,060			39,355	18.0	17.4
Detroit & Mackinac	8,966	111,178	29	39,329	71,694	6.6	13,803	51,673	3.2	177,923	360,019	5.9	240,022	594,567	4.8	90,318	18.8	26.8
Detroit & Toledo Shore Line	211	253,515	3	65,374	102,964	7.7	23,049	174,139	1.6	109,483	439,052	2.9	201,935	969,672	2.3	42,232	7.0	10.2
Detroit, Toledo & Ironton													762,458			+56,490	9.4	10.2
Duluth & Iron Range													689,448			+10,962	15.3	15.4
Duluth, Missabe & Northern													1,391,131			+308,302	18.0	15.1
Duluth, South Shore & Atl.													613,086			54,649	15.4	16.1
Elgin, Joliet & Eastern	37,388	1,307,817	10	180,509	512,807	4.3	186,466	443,431	5.0	1,080,157	2,744,658	4.7	1,497,468	5,155,108	3.5	+310,067	8.7	7.1
Erie Lines	231,388	9,887,922	8	2,183,941	3,074,592	8.6	253,575	3,772,022	0.8	3,055,711	17,776,543	2.1	5,656,838	34,511,081	2.0	173,696	5.5	5.8
Florida East Coast	143,478	991,496	52	70,795	248,527	3.4	220,857	105,990	26.5	1,724,945	3,846,140	5.4	2,173,950	5,192,513	5.0	516,679	23.0	27.1
Fort Smith & Western	2,116	106,911	7	8,956	56,459	1.9	7,924	1,371	79.0	127,991			146,989			56,990	11.7	15.8
Fort Worth & Denver City	113,566	965,324	42	62,575	270,765	2.8	90,894	298,235	3.6	655,288	2,884,451	2.8	942,889	4,418,777	2.6	+217,871	11.9	10.2
Georgia	25,160	599,288	15	125,850	209,020	7.2	22,871	67,954	4.1	488,620	952,277	6.2	677,284	1,828,540	4.4	+36,657	17.4	14.7
Georgia & Florida	4,928	176,481	10	2,695	64,979	1.0	4,194	198	250.0	92,072	184,052	6.0	103,891	425,712	2.9	9,352	6.2	8.3
Grand Trunk Western	429,098	2,784,125	67	433,109	879,872	6.0	209,291	413,163	6.1	1,736,722	5,384,961	3.8	2,963,715	9,462,121	3.6		11.1	
Great Northern	1,078,742	10,765,826	36	2,369,941	3,192,615	8.9	863,023	2,463,866	4.2				12,023,045			+1,208,749	14.5	13.0
Green Bay & Western	15,400	246,789	22	62,255	100,418	7.4	77,370	84,373	11.0	238,016	265,684	10.8	393,042	697,265	6.8	+71,633	25.2	24.0
Gulf Coast Lines	240,112	1,030,605	84	400,598	969,498	5.0	148,936	425,402	4.2	1,112,317	5,167,070	2.6	1,901,964	7,592,607	3.0	45,758	14.1	16.0
Gulf, Mobile & Northern	16,636	312,106	19	58,496	178,812	3.9	23,158	91,051	3.1	381,272	540,427	8.4	486,940	1,122,398	5.2	90,835	9.3	10.7
Hocking Valley	17,530	909,422	7	249,273	655,945	4.5	15,044	457,135	.4	302,278	3,080,056	1.2	601,563	5,102,558	1.4	69,286	4.8	5.3
Illinois Central System	402,764	10,689,618	13	775,906	3,536,053	2.6	1,367,434	3,316,014	5.0	7,982,533	26,027,167	3.7	10,947,292	43,568,852	2.9	+566,694	7.8	7.4
Indiana Harbor Belt	15,283	1,207,018	5	98,131	148,034	8.0	77,646	179,300	5.2	527,192	3,170,417	2.0	718,253	4,704,770	1.8		8.8	
International-Great Northern	335,313	1,256,412	97	741,093	416,573	21.2	266,763	107,500	32.0	1,532,669	2,140,821	8.5	2,918,749	3,921,308	8.9	+522,636	20.2	16.3
Kansas City Southern	389,289	1,461,054	95	418,172	515,171	9.8	253,281	786,488	3.9	965,609	2,869,298	4.0	2,024,351	5,632,011	4.3	+67,396	14.2	13.9
Lake Superior & Ishpeming	47,479	142,950	120	21,582	53,772	4.8	29,685	65,493	5.5	154,243	299,703	6.2	261,661	561,920	5.6	+7,010	16.7	17.5
Lehigh & Hudson River														106,779		19,025	6.0	6.8
Lehigh & New England	35,138	361,663	35	98,246	107,757	10.9	63,839	64,430	11.9	203,170	537,589	4.5	410,348	1,075,979	4.6	31,020	10.9	11.1
Lehigh Valley	291,424	5,658,886	19	636,766	1,577,373	4.8	442,580	630,623	8.4	2,806,894	11,256,895	3.0	4,286,922	19,123,779	2.6	871,368	8.0	9.6
Long Island													1,426,866			+355,699	5.2	3.8
Louisiana & Arkansas													911,744			+432,168	17.3	19.5
La. Ry. & Nav. Co. of Tex.	12,637	79,737	57	32,708	74,003	5.3	6,603	8,334	9.5	95,841	9,820	11.7	147,791	171,895	10.4	+31,713	14.3	11.5
Louisville & Nashville													12,102,593			+690,981	11.5	11.5
Maine Central	60,155	1,521,388	12	462,531	345,008	16.0	126,151	92,632	16.4	1,202,357	1,315,957	11.0	1,851,195	3,274,986	6.8	+28,592	12.3	12.1
Michigan Central	451,126	7,320,540	22	896,471	1,271,256	8.5	315,144	2,627,114	1.4	3,759,181	17,037,597	2.6	5,487,689	28,256,508	2.3	767,215	8.5	10.0
Midland Valley													240,778			+8,753	11.9	10.5
Minneapolis & St. Louis	52,239	1,136,943	16	166,199	340,358	5.9	76,319	169,741	5.4	742,576	1,805,537	4.9	1,037,333	3,452,579	3.6	307,032	8.8	10.8
Minn., St. P. & S. S. Marie	242,439	3,530,868	25	1,057,904	1,463,626	8.6	272,113	478,393	6.8	2,118,616	4,817,606	5.3	3,835,105	10,290,495	4.4	595,002	10.8	12.5

Road	Fuel			Ties			Rail—All Kinds			Other Material—Less Scrap			Total Material				Ratio to Op. Exp.	
	On Hand Dec. 31	Used 12 Mos.	Days' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Dec. 31	Used 12 Mos.	Months' Supply	On Hand Report to I. C. C.	Used 12 Mos.	Months' Supply	Reduction	1929	1928
Mississippi Central	3,236	74,430	16	4,522	39,100	1.4	20,287	13,802	17.6	79,338	169,269	5.6	109,346	296,603	4.4	+18,291	9.2	7.7
Missouri & North Arkansas	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	172,374	.....	...	+20,288	10.0	10.0
Missouri-Kansas-Texas Lines	1,238,840	3,483,465	128	1,378,716	1,614,581	10.2	508,161	978,045	5.0	2,433,559	8,771,866	3.3	5,459,277	14,847,958	4.4	59,533	14.5	14.2
Missouri Pacific	747,863	8,627,398	31	2,018,865	3,432,170	7.0	756,392	2,516,699	3.6	9,738,881	26,531,113	4.4	13,262,002	41,097,381	3.8	+1,926,253	12.9	11.5
Mobile & Ohio	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	1,178,004	.....	...	+68,062	8.9	8.5
Monongahela	2,824	194,508	5	37,940	86,875	5.3	24,446	142,786	2.1	309,159	523,541	7.1	374,370	947,712	4.7	9,730	9.8	10.1
Montour	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	144,151	.....	...	+17,394	9.0	9.6
Nashville, Chat. & St. Louis	71,726	1,147,751	22	503,727	571,316	10.5	99,747	221,238	5.4	1,129,752	3,044,784	4.4	1,804,954	4,985,090	4.4	113,418	10.4	10.5
Nevada Northern	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	147,436	.....	...	+9,899	29.0	26.6
New Orleans Great Northern	4,437	126,022	13	4,567	104,868	0.5	11,274	20,502	6.5	114,206	345,386	4.0	135,008	596,779	2.7	52,199	5.6	8.5
New York Central	968,310	38,608,802	9	5,404,219	11,031,799	5.9	3,163,275	18,525,037	2.1	20,113,675	82,633,253	2.9	30,313,428	150,798,913	2.3	+2,091,832	10.0	9.8
New York, Chicago & St. L.	77,621	4,070,644	7	942,541	1,293,249	8.7	365,959	1,583,627	2.7	2,133,051	11,200,604	2.3	3,519,174	18,148,126	2.4	+196,534	8.8	8.8
New York, N. H. & H.	644,411	6,027,164	39	1,450,464	2,296,309	7.6	742,188	1,308,902	6.8	7,432,379	20,473,423	4.3	10,269,442	30,105,798	4.1	1,201,094	10.9	12.2
New York, Ont. & Western	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	1,173,238	.....	...	63,431	11.5	11.6
Norfolk & Western	190,836	4,940,903	14	1,030,654	1,845,881	6.7	616,019	4,078,539	1.8	5,828,344	23,763,179	2.9	7,665,854	34,628,504	2.6	2,552,861	11.6	15.3
Norfolk Southern	8,975	513,764	6	81,403	290,413	3.4	102,275	92,993	12.2	508,637	644,978	9.5	701,293	1,542,151	5.5	32,135	11.6	11.2
Northern Pacific	473,614	7,914,344	22	2,765,302	2,251,391	14.7	848,845	1,673,279	6.1	6,652,916	14,215,735	5.7	10,933,802	26,034,749	4.9	419,688	15.5	16.0
Northwestern Pacific	32,297	438,561	27	48,221	148,158	3.9	124,280	202,749	7.4	449,878	602,751	9.0	660,443	1,411,987	5.6	76,841	12.2	12.8
*Pennsylvania	785,177	30,881,504	9	8,531,575	9,490,105	10.9	1,189,382	15,286,443	0.9	30,234,959	132,413,807	2.8	41,735,274	188,071,860	2.6	+1,187,544	8.3	8.5
Pere Marquette	348,787	3,065,992	41	674,820	1,020,630	7.9	198,249	1,361,488	1.7	1,198,955	4,737,081	3.1	2,478,917	10,185,193	2.8	264,127	7.2	8.8
Pittsburgh & Lake Erie	57,544	1,767,697	11	449,307	264,681	20.0	142,793	265,751	6.5	1,933,156	7,211,095	3.2	2,635,071	9,509,225	3.2	46,665	9.3	10.4
Pittsburgh & Shawmut	3,391	102,972	12	2,985	52,544	6.8	31,913	7,566	50.8	98,490	152,604	7.8	136,780	315,687	5.2	+13,256	11.4	9.4
Pittsburgh & West Virginia	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	314,440	.....	...	+195,920	10.7	4.6
Pittsburgh, Shawmut & No.	.....	98,441	...	6,114	104,495	7.0	37,181	10,467	42.6	164,534	118,691	16.5	207,831	332,095	7.5	964	12.5	13.8
Reading System	785,559	6,968,362	41	965,029	1,352,461	8.5	901,496	2,341,533	4.0	6,454,550	15,914,299	4.8	9,003,103	26,576,657	4.1	+979,554	11.5	10.8
Richmond, Fred. & Potomac	120,368	814,962	55	107,877	225,545	5.8	50,682	412,498	1.5	936,329	1,363,069	8.2	1,215,258	2,816,075	5.2	29,005	14.9	16.0
Rutland	101,267	522,309	70	130,844	275,586	5.7	58,232	89,583	7.8	338,352	490,342	8.3	633,420	1,377,822	5.5	82,042	12.5	13.4
St. Louis-San Fran. Lines	339,097	6,064,660	20	1,184,163	2,046,524	6.9	221,479	768,693	3.5	3,434,510	11,361,269	3.6	5,447,887	.....	...	+99,092	8.7	9.0
St. Louis Southwestern Lines	942,200	1,582,134	212	657,623	1,304,818	6.0	528,836	650,618	9.7	2,310,824	5,132,516	5.4	4,476,686	8,670,088	6.2	374,906	22.1	31.6
Seaboard Air Line	391,640	3,731,095	37	412,292	1,522,836	3.2	633,940	588,269	13.0	2,138,329	5,834,771	4.4	3,812,670	11,676,978	3.9	+32,803	9.5	9.3
Southern System	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	9,222,917	.....	...	3,225,949	6.8	9.4
So. Pacific—Pacific Lines	6,857,320	18,102,735	137	2,706,903	4,785,062	6.8	2,500,343	7,085,574	4.2	10,625,367	34,817,992	3.7	23,487,981	66,902,367	4.1	2,164,678	15.3	17.0
Spokane, Portland & Seattle	52,689	548,793	27	53,297	295,929	2.5	372,770	51,545	88.0	532,111	1,075,799	5.9	1,030,869	2,002,008	6.2	+60,245	17.5	16.5
Tennessee Central	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	252,581	.....	...	85,476	10.0	13.2
Texas & New Orleans	908,922	4,649,093	70	1,321,471	2,036,119	7.8	557,090	1,995,392	3.4	3,835,804	11,731,981	3.9	6,987,085	20,412,686	3.9	179,738	12.7	13.0
Texas & Pacific	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	6,091,229	.....	...	+520,229	19.2	16.1
Trinity & Brazos Valley	79,049	185,795	15	70,977	99,090	8.6	416,554	545,311	9.2	305,079	530,668	6.9	913,235	1,360,866	7.7	+583,579	33.6	15.6
Ulster & Delaware	7,058	131,618	19	1,220	14,178	1.0	7,766	1,516	61.0	147,902	83,713	21.2	166,772	231,026	8.5	8,338	17.5	13.8
Union Pacific	1,087,287	14,950,283	26	3,883,953	3,163,306	14.7	2,281,073	2,798,657	9.8	10,395,516	27,794,303	4.5	18,352,242	48,706,550	4.4	+2,085,904	12.4	10.8
Virginian	17,366	801,927	8	361,147	.....	...	109,870	.....	...	1,447,827	.....	...	1,945,404	.....	...	139,862	19.5	20.3
Wabash	168,226	4,288,529	14	1,109,050	1,048,777	12.7	184,106	1,262,981	1.8	2,909,299	10,262,731	3.4	4,371,183	16,863,020	3.1	320,392	7.8	8.9
Western Maryland	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	1,584,545	.....	...	425,588	12.4	15.9
Western Pacific	91,243	1,477,965	22	335,050	473,837	8.5	927,451	109,371	102.0	1,434,729	4,517,563	3.8	2,788,473	6,578,736	5.1	46,133	19.2	20.0
Wheeling & Lake Erie	18,749	804,638	8	354,102	746,772	5.7	114,441	685,160	20.0	644,316	4,139,432	1.8	1,131,610	6,376,004	2.1	+79,206	7.8	7.6
Wichita Valley	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	130,862	.....	...	+134	16.0	13.3
Average Turnover	.....	.....	32	.....	.....	8.1	.....	.....	3.9	.....	.....	3.5	.....	.....	3.4	.....	...	...

* Note: Total on hand for Pennsylvania includes material received but not paid for. Net as reported to I. C. C. is $38,401,815, representing reduction on this basis of $2,145,915 from 1928 net.

584,410, was a net reduction of only $848,042 from the book value of stocks on hand at the close of 1928, while the inclusion of the figures, of three trunk lines not incorporated in last year's analysis, bring the preliminary total for 1929 up to $471,118,000, or about $40,000,000 higher than the total shown by the total inventory of Class I roads published by the Interstate Commerce Commission for 1928.

The total inventory of Class I roads during the year comprises about $40,000,000 for fuel, $95,000,000 for ties, $45,000,000 for rail and $292,000,000 for stores and miscellaneous material. Based on the average consumption during the previous 12 months, the year ended with a 32-day supply of fuel on hand, a 324-day supply of ties, a 111-day supply of rail and a 102-day supply of stores material.

The book value of unapplied materials on hand on Class I railways at the close of each year since 1916 with the increases and decreases, are given in Table 1. In the table, the inventories shown for each year up to 1928, inclusive, are the totals in the annual reports of the Interstate Commerce Commission, while the subsequent figures are those compiled by the *Railway Age* from the annual reports filed with, but not yet published by, the Interstate Commerce Commission. It will be seen from the table that the year 1929 was the first year with one exception in several past when there were not noteworthy reductions in the supply balance. Disregarding the increase in traffic and change in the value of the dollar, inventories are still over 100 million dollars, or 40 per cent above those in 1916, but are approximately 200 million dollars less than in 1920.

First Turnover Figures

Table 11 gives the book value of supplies which each road has filed with the Interstate Commerce Commission as of the close of 1929, together with the increase or decrease over the corresponding statements filed a year previous. The table also shows what percentage each road's inventory is of its annual operating expenses and gives the corresponding ratios for the year previous. The table also gives a classified statement of materials on hand at the close of 1929 and used during the previous 12 months as they have been reported by the individual carriers to the *Railway Age*, and affords a comparison of these statements on the basis of the days' or months' supply which each year's year-end inventory represents. The table comprises the first instance where figures of this kind for the individual carriers have been compiled and made public.

In presenting the figures relating to the quantities of fuel, ties, rail and stores material on hand and used, the *Railway Age* recognizes the impracticability of reducing the figures on all roads to an absolutely uniform basis by reason of the lack of uniformity with which different railways keep their books and, therefore, makes no claim for the figures other than that they are published substantially as received in reply to questionnaires and that their study will afford the most comprehensive and accurate insight into the supply operations of the railways that has been possible up to the present.

Seven roads show reductions of $500,000 or more in their total stock, as compared with that reported at the close of the previous year to the Interstate Commerce Commission and 14 roads ended the year with an increase of $500,000 or more in their total stocks. The preliminary figures show that the Southern Lines, comprising the Alabama Great Southern, the Cincinnati, New Orleans & Texas Pacific, the Georgia & Southern & Florida, the New Orleans & North Eastern and the Northern Alabama, effected a reduction of $3,225,000. The Norfolk & Western shows a reduction of $2,552,000; the Southern Pacific Lines, a reduction of $2,164,000; the New Haven, a reduction of $1,201,000 and the Lehigh Valley, Michigan Central and Central of Georgia, reductions of $871,000, $595,000 and $583,000, respectively. The reduction of $2,252,000 on the Norfolk & Western was the most spectacular. Roads showing substantial increases are as follows: Union Pacific system, $2,085,000; New York, Chicago & St. Louis, $2,091,000; Missouri-Kansas-Texas lines, $1,926,000 Northern Pacific, $1,187,000; Grand Trunk Western, $1,208,000; Chicago, Milwaukee, St. Paul & Pacific, $1,053,000; Reading, $979,000; Louisville & Nashville, $690,000; Boston & Albany, $594,000; Illinois Central, $566,000; International-Great Northern, $522,000.

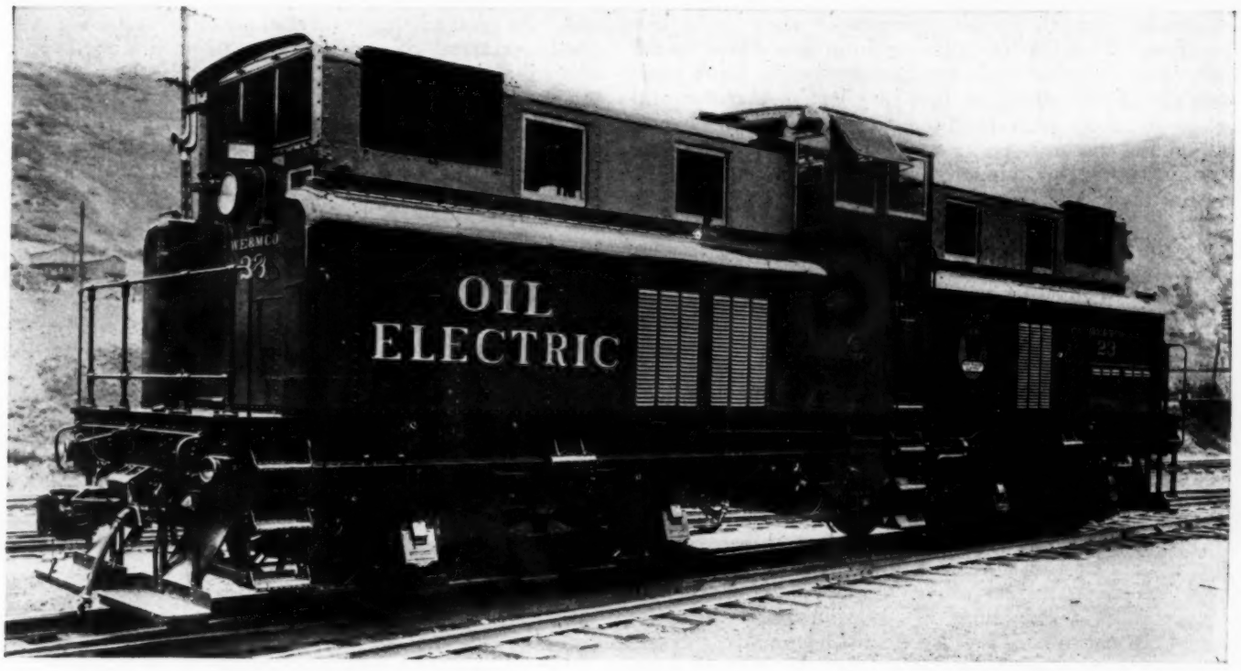
The ratio which each road's total book value of material and supplies bears to its annual operating expenses is criticized by some as a basis of comparing the efficiency with which a road conducts its supply operations. It is believed by some that this ratio is unsound for the reason that the stocks include materials not chargeable to operating expenses, as well as those chargeable to operating expenses. It is also said that this ratio is likely to be unfair—unfair to the road because of the different physical and operating conditions of the carriers and their distances from sources of supplies, and unfair to the departments which, while charged with the custody of material, do not control operating expenditures which may be arbitrarily increased or decreased from causes not associated with material. Within reasonable limits, it can not be denied, however, that the material which a railroad uses and carries bears a close relationship to the expenses of operation. The ratio is popular with many, moreover, on the ground that it tends to reflect conservation in the use of material, whereas a turnover index tends to encourage stores to release material which it might be more largely in the interests of the company to keep in stock. The chief merit of the operating ratio index, however, lies in the facts that it is determined from official corporation statements and is the only single index at present available for all railways; its use is, therefore, continued in these summaries which the *Railway Age* has been making for several years.

The analysis shows that the material and supplies reported by the railroads last year ranged from 4.4 per cent of annual operating expenses to 20.2 per cent, with the Chesapeake & Ohio, the Delaware, Lackawanna & Western, the Chicago Great Western and the Erie leading the list of roads of a thousand miles or more of line, with balances at the close of 1929 representing 4.4 per cent, 5.0 per cent, 5.2 per cent and 5.5 per cent, respectively. Out of 115 roads for which these ratios have been computed, there were 54 roads with ratios under those of 1928 while 44 had ratios less than 10 per cent, a larger number of roads than in previous years. Among the roads with ratios under 10, besides those already mentioned, are the Chicago & Eastern Illinois, with a ratio of 6.3; the Southern, 6.8; the Pere Marquette, 7.2; the Boston & Albany, 7.2, the Bessemer & Lake Erie, 7.4; the Boston & Maine, 7.7, and the Wheeling & Lake Erie, 7.8.

The divisions of the total balance afforded this year and the determination of a turnover figure are made in recognition of the fact that stocks of fuel, rail and ties profoundly affect the total book balance of supplies and are not regulated under the same policies or handled in their entirety by the departments responsible for the common materials; also that a study on a turnover basis is not only highly desired but in demand. It was necessary in developing these figures to canvass the roads directly and where no explanations were made it is assumed that the reports give the total amount of each class of material on hand and the amount of materials issued to close accounts for both operations and improvement work, although it is expected that some roads have not included fuel used for heating as well as for locomotives, that some reports of ties do not include ties at treating plants and that stores material includes substantial charges on the books for scrap waiting reclamation or sale and possibly also obsolete machinery. In all cases, the days' or months' supply is determined by assuming that the supplies reported on hand at the close of the year represent the average monthly supply balance. Obviously this is particularly subject to error in connections with ties and rail which are likely to be in process of accumulation at the close of the year and are not subject to uniform consumption.

With these explanations, it is observed that the stocks of fuel reported on hand at the close of the year 1929 ranged from one day's supply to 212 days' supply, measured by the previous 12 months' consumption, and averaged 34 days. Tie stocks, which must be accumulated well in advance of their use for seasoning and treatment, range from a one day's supply to 21 months' supply, and averaged 8 months' supply. Rail ranged from 1½ months' supply to three or more years' supply and the average was 6 months. Stocks of other material, including stationery and commissary, but for the most part excluding scrap, ranged from a 1½ months' supply to a 21 months' supply and the average was 3.6 months, while total stocks ranged from an average of 1.2 to 19.2 months and averaged 3.4 months.

It is noteworthy that the store departments of a large number of roads are operating on a two months' supply or less, according to their reports of miscellaneous material on hand and used. Among stores keeping their turnover in this range are the Boston & Albany, with a 2.9 months' supply; the Central of New Jersey with 2.5 months' supply; the Central Vermont, showing a turnover of 2.0; the Chicago & Alton, 1.9; the Chicago & Eastern Illinois, 2.5; Chicago, Indianapolis & Louisville, 2.6; Chicago, Rock Island & Pacific, 2.6; the Delaware, Lackawanna & Western, 2.8; the Elgin, Joliet & Eastern, 2.1; Michigan Central, 2.6; New York, Chicago & St. Louis, 2.3; and the Wheeling & Lake Erie, 1.8. Whether the turnover figures for these roads reflect the practice of including scrap sales in the disbursements or the practice of charging out any material before it is applied has not been the purpose of this analysis and must be left to independent study.



The Locomotive is Powered by Two 400-Horsepower Oil Engines

An 800-Horsepower Oil-Electric Locomotive

The cab allows good visibility in all directions and the locomotive may be operated from either side

By A. R. Brown

Railway Equipment Engineer, Westinghouse Electric & Manufacturing Company

AN 800-hp., 110-ton, Baldwin-Westinghouse oil electric locomotive, which incorporates several novel features of design, has been completed recently for use in steam railroad transfer and heavy yard switching service. The running gear is of the B-B type, having two two-axle equalized swivel trucks. Four axle-hung, series type, d-c. traction motors receive power from two 400 hp. oil engine-generator units.

The design of cab is such as to secure maximum visibility in all directions for the operator without sacrificing accessibility to oil engines and electrical equipment for maintenance and repairs. To attain this end the operator's cab is located in the center of the locomotive and is elevated above the level of the main floor. Equipment compartments on either side of the operator's cab have set-back side walls, so that a direct view is obtained to the front and the rear from each of the two operator's control stands, and over the top of the equipment compartments as well. Dual control for the operator enables him to transfer from one side of the cab to the other at will without the necessity of throwing control switches and transfer valves. The transfer can be made at any time, whether the locomotive is in motion or at standstill with full control of power and braking at all times.

Each equipment compartment contains an engine-generator unit having its center of gravity located over the truck center pin. Two-hundred-twenty-five gallons of fuel oil are provided in each compartment, stored in tanks mounted horizontally under the side walls at a height to afford gravity feed to the oil engines. Compartment roofs and end sheets are removable so that the engine-generator units can be either hoisted or skidded out. Clearances in the engine rooms enable pistons and cylinder liners to be replaced without removing the roof.

All controls, cut-outs and fuses are accessible from the operating compartment with the exception of the traction motor cut-outs. The master controller and brake stand are located under the raised floor of the engineman's compartment, the operator's handles being mounted in duplicate stands at each control position. The handles are connected by positive linkages to the master controller drums and brake valves, arranged so that as a handle position is taken at one stand the cor-

responding handle at the other stand moves to a like position. Thus in transferring from one stand to the other the operator finds the handles in the same position as at the stand he has just left. A meter and gage panel at each position carries air brake gages, main and battery ammeters, and lubricating oil and cooling water thermometers for each oil engine.

Oil Engines

Each of the high-speed, solid-injection oil engines develops 400 hp. at 900 r.p.m. They have six cylinders, 9-inch bore and 12-inch stroke, and operate on the four-stroke cycle. They are manufactured at the Westinghouse South Philadelphia Works and are a development of the light-weight types which have been extensively used on the Canadian National Railways. The engine and flywheel weigh approximately 8100 lb., or 20.3 lb. per hp. The generator is mounted with the engine on a welded steel bedplate which contains the lubricating oil reservoir, separated from the crank case sump.

An oil-pressure type governor is used to regulate the amount of fuel oil injected into the cylinders. This type of governor has proven highly satisfactory and incorporates a minimum of wearing parts. Engine speed is controlled by an electro-pneumatic throttle operator which regulates the amount of fuel admitted to the injection pump. For each engine-speed notch the timing is automatically adjusted. The fuel pump is geared to the engine crank shaft and has six cylinders, allowing the maximum pressure of each engine cylinder to be adjusted.

The exterior of the engine is free from most fixtures susceptible to damage, yet is easily accessible for maintenance by removable covers and inspection doors.

Protection against low lubricating oil pressure is afforded by a pressure piston which actuates a tripping mechanism in the fuel line when the pressure falls below normal. Electrical shut-down of the engine may be accomplished also by an electro-pneumatic cylinder which actuates this same mechanism.

The oil engines are started by using the main generator as a motor, obtaining power from a storage battery. Starting controllers are located near the front end of each engine. After the initial starting, when air pressure is available, the engines may be tripped and either or both started remotely from the operator's cab. This allows the engines to be shut down during short lay-overs and restarted with practically no loss of time.

All piping has been assembled with the minimum number of threaded joints. The oil piping is brass with Mueller stream-line soldered fittings. The water piping is extra strong wrought iron. Victaulic pipe couplings are used in both water and oil lines, providing leakage-proof flexible joints which can be quickly and easily broken and re-assembled.

Control

"Torque control" regulates the loading of each oil engine so as to develop the maximum horsepower which the engine condition will allow it to deliver without exceeding the rated value. This control automatically adjusts the loading to suit the varying factors of injection and timing common to all Diesel type engines so that each engine always maintains a definite speed at each loading point and delivers the output of which it is capable at that point. To accomplish this result a regulator is actuated by the voltage of the auxiliary generation, which in turn depends on the engine speed at each throttle notch. The regulator contacts control vibrating contactors in the main generator shunt field circuit. As each master controller notch is taken the regulator electrical constants are established, the throttle opened and the engine speeds up until the auxiliary voltage for that notch causes the regulator to operate, increasing the main generator excitation to a loading value which will hold the engine speed at the value selected for that notch. A smooth, stable loading and quick acceleration is the result. This system of control has been thoroughly proven by test and field installations to take care of ordinary varying engine conditions.

The use of this type of control, having an approximately constant voltage auxiliary generator, allows compressor operation and battery charging to be obtained virtually at all times. During power notching this auxiliary load is taken from the auxiliary generator and when the engine is idling the load is transferred to the main generator. The control is readily adaptable to multiple unit operation by the addition of control jumpers and receptacles.

Weight Transfer Compensation

The inherent characteristic of an electric drive to operate at a high factor of adhesion is further improved on this locomotive by an electrical compensation for weight transfer. Despite a well designed mechanical equalization, motor-driven trucks during acceleration have a transfer of weight from the leading to the trailing drivers. The result is that the leading drivers slip at limiting adhesion while the trailing drivers yet have the capacity to develop higher traction. The compensation for this transfer is brought about by shunting the fields of the leading driver motors so as to decrease their torque with respect to that of the trailing motors. This compensation is such that both drivers will tend to slip at approximately the same time and the total workable adhesion will be correspondingly increased.

The electrical connections for this compensation are very simple, a field shunting contactor and resistor for each motor being required which are controlled by a push-button. Connections are automatically changed to shunt the proper motor fields when the locomotive is reversed and in addition the field shunting on all motors

General Data

Total weight of unit	220,000 lb.
Classification of wheels	B-B
Weight per driving axle	55,000 lb.
Number of driving axles	4
Starting tractive effort (30 per cent adhesion)	66,000 lb.
Maximum starting tractive force	77,000 lb.
Tractive force—continuous rating at 9.6 m.p.h.	23,000 lb.
Maximum safe speed	45 m.p.h.
Track gage	4 ft. 8½ in.
Total wheel-base	33 ft. 10 in.
Rigid wheel-base	8 ft. 6 in.
Minimum radius of curve—locomotive alone	175 ft.
Minimum radius of curve—with load	225 ft.
Length over-all (coupler knuckles)	47 ft. 8 in.
Length of cab	38 ft. 6 in.
Width over-all	10 ft. 7 in.
Over-all height of locomotive	15 ft. 3 in.
Diameter of drivers	44 in.
Engines per cab	2—Westinghouse
Type and fuel	Solid injection—oil
Cylinders	6—9 in. x 12 in.
Cycle	4 stroke
Rating	400 hp. at 900 rpm.
Generators per cab	2—Type 477-B-8, 500 volts, d-c., direct connected to oil engine
Auxiliary generators	2—Type YG-15-A-2
Number and type of motors	4—Type 360-A, force ventilated
Gear ratio	16:67
Control	Electro-pneumatic, center cab with dual control, series, parallel, field shunt. Automatic loading of engine by torque control.
Battery	64 volts, 204 amp. hr.
Compressors per cab	2—Type D-3-F
Radiators	Force cooled with automatic control

is used as a high speed notch after parallel motor connections are established.

Cooling and Heating System

The radiators for cooling lubricating oil and water are mounted vertically in the end of each equipment compartment roof. A propeller type fan, driven by a vertical blower motor, draws air through the radiators and expels it through the roof. At shut-down the oil drains to the bedplate reservoir and the water to a tank located below the radiators on the front sheet of the locomotive above the engine jacket level.

A coal heater, located under the raised floor of the operating cab is provided for heating the cab in cold weather by direct radiation and by water circulation through finned radiator pipes. At shut-down a connection to this heater allows the engine cooling water to be circulated through it to prevent freezing. This connection may also be used to heat the operator's cab from the engine cooling system.

Westinghouse No. 14-EL air brake equipment is used, applying brakes to all wheels. Two Westinghouse type D-3-F compressors are used, of 35 cu. ft. per min. capacity each. Straight air control for the locomotive alone and automatic air control for locomotive and train are provided. The brake valve is of the pedestal type, mounted below the raised operator's floor and connected by linkages and sprockets to the dual stands. Two 10-in. x 12-in. type B brake cylinders are provided on each truck, affording a braking effort of approximately 85 per cent at 50 lb. per sq. in. cylinder pressure.

Electrical Apparatus

A Westinghouse railway type 477-B-8 d-c. generator is directly connected to each oil engine. The generator is of the variable-voltage type and has a series field for engine starting, a main shunt field and a commutating field. A 64-volt auxiliary generator is carried on the commutator end of each main generator frame.

Traction motors are Westinghouse type 360-A, force ventilated, designed for high tractive effort at low speeds. Motors are axle hung with a 16:67 gear ratio and the wheel diameter is 44-in.

A blower for each pair of motors is mounted on the underframe between trucks. Air is delivered by built-in ducts and canvas connections. The blower intake is provided with an expanded metal oil screen to remove dust and dirt from the incoming air. This type of air filter is easily removed for cleaning and has been shown by tests to remove approximately 90 per cent of the dirt from the air flowing through it.

The storage battery is an Exide Ironclad type MVA-13, 32-cell, 64-volt battery, having a 6-hour rating of 204 ampere-hours. Sixteen cells are located in a battery box in each engine room and are ventilated by louvres in the cab sheets.

Traction motor control is by electric-pneumatic unit switches and reversers. Motor connections are series, parallel and shunt field using shunt transition with no reduction in engine speed. Two motors receive power from each generator, the group having its unit switches, reverser, cutouts and loading control located in a control cabinet in the engine room. Auxiliary apparatus is controlled by magnetic contactors. The loading regulator is of the dynamic type, having knife edge bearings and large carbon contacts to assure long life and immunity to damage from vibration and hard usage.

Cab and headlights are controlled from the operator's compartment and operate on 32 volts. Extension and overhead lights are provided in the engine rooms and switchman's steps are illuminated.

Urgent Need to Study Transverse Fissures

ATTENTION has again been directed by James E. Howard, engineer-physicist, Interstate Commerce Commission, to the urgent need for an intensive study of the causes and possible remedies for that class of rail failures in which transverse fissures are displayed. "The vital features of this problem have been neglected long," he says, "and owing to the introduction of heavier equipment and higher speeds, the question is presented whether service conditions have not practically destroyed the residual elements of safety in steel rails." In view of this situation, Mr. Howard raises the question whether there is any reasonable hope of a reduction in the number of such rail failures.

"As time advances," says he, "certain phases of the problem become more prominent by reason of the urgency for their investigation and these are emphasized by the absence of any well-directed or concerted efforts toward the acquisition of the much needed information." He cites the report of the engineer of tests of the Rail committee of the American Railway Engineering Association that up to January 31, 1929, the number of transverse fissures reported had reached 35,797 and that they are increasing at a rate in excess of 5,000 annually. It is his belief that the Sperry detector car has provided a means of research in this important field which has not been possible heretofore.

The occasion for this warning was the derailment of a passenger train on the Pennsylvania at Onley, Va., on December 1, 1929, in which 8 passengers and 1 employee were killed and 30 passengers, 1 employee and 1 news agent were injured. The accident was caused by a broken rail which contained two transverse fissures. The train involved was an excursion train composed of 10 cars, all of which were of all-steel construction. The accident occurred on the northbound track, on tangent, while the train was running at an estimated speed of 45 to 55 miles an hour. The track was laid with 100-lb. rail, 33 ft. long, which was fully tie plated and supported on 18 ties to the rail length. The ties were good, the ballast was cinders and stone and the track was well-maintained.

From the evidence, W. P. Borland, director, Bureau of Safety, Interstate Commerce Commission, concluded that the accident was caused by a broken rail which contained transverse fissures. In his report he emphasized the fact that no unusual features attended this derailment which are not common to other accidents involving transverse fissures, but that it was simply another accident of its kind. An examination of the rail was made by Mr. Howard, from whose report the following is abstracted:

"The derailment was caused by a broken rail, which displayed two transverse fissures, each covering about one-half of the cross section of the head, and each of which had reached the peripheral surface of the head on the gage side. No unusual features or circumstances attended the derailment that are not common to accidents which are caused by the presence of transverse fissures. It was simply another accident of its kind.

"It is an open secret that practically all railway engineers ascribe the fundamental cause in the display of transverse fissures to defective steel for which, in their judgment, the manufacturers are responsible. These allegations have not as yet taken tangible form.

"There are controllable conditions at the steel mills

which influence the physical properties of the finished rails. The chemical composition and mechanical treatment most suitable in the fabrication of the rails should be established definitely. There seems to be no insurmountable difficulties in the way of arriving at convincing conclusions on many phases of the subject. The production of steel rails is one part of the problem; the proper use of the rails constitutes another part of the same problem, not inferior to the first.

"The rail which was involved in the accident displayed two transverse-fissure fractures. The first occurred at a point 23 ft. 8 in. from the receiving end, the second being about 30 in. beyond the first. Beyond these two fissures the rail was fragmented at the time of the derailment but without showing any additional fissures. The longer fragment of the receiving end was subsequently broken under the drop in quest of other fissures, but none was found.

"Between Onley, Va., and Farnhurst, Del., 153 miles, 34 rails of the 100-lb. section had been removed from the track because of transverse fissures during the 14 months ending with December, 1929. Only one derailment had occurred, however, in addition to the Onley derailment. This happened about two months earlier, and the rail displayed nine transverse fissures, the longest fragment between fissures being 5 ft. 1 in. and the shortest 8 in. This rail had been in service 16 yr.; the average life of all the rails removed for this cause was 13 yr. 6 mo.

"The Sperry detector has opened a wide field for research which has heretofore been denied. It gives an opportunity to acquire information concerning the inception and growth of transverse fissures under different track conditions which is of importance. Provided a rail has only one fissure in process of development, and that it is located some distance from the end, it would seem that danger would be kept at a minimum by splicing across the place occupied by the fissure. Thus an opportunity is offered to follow its enlargement with the Sperry detector.

"The influence of speeds, about which little is known, is among the features upon which such observations would be expected to throw light. Much could be learned by available means and no time should be lost in making the observations. Indifference to this branch of the subject already presents a disquieting situation. What greater incentive for action could be afforded than the daily display of fractures of this dangerous type?

"During the same period of 14 months, a total of 257 rails were removed from the track on the Eastern region of the Pennsylvania because they displayed transverse fissures. Of these, 164 weighed 130 lb., per yd., 12 were 125-lb. rails, 78 were of the 100-lb. section and 3 were 85-lb. rails. The ages in service ranged from 3 mo. to 40 yr. Twenty-six were less than a year old; nine were more than 20 years old. Of the 130-lb. rails, 24 less than a year old were selected and the ingot letters recorded as follows:

Ingot letter	A	B	C	D	E	F	G
Number of rails	4	4	4	6	1	3	2

"Their distribution in different parts of the ingot does not show a predisposition to display fissures in rails from any particular part of it. The rail of shortest life, 3 months old, bore the ingot letter C. Out of a group of 31 rails over 6 years old each, the following results appeared:

Ingot letter	A	B	C	D	E	F	G
Number of rails	4	6	6	9	0	2	4

In a larger group of 212 rails the ingot letters were:

Ingot letter	A	B	C	D	E	F	G
Number of rails	64	31	38	42	16	10	11

"The heat numbers of 210 of the 257 rails were found. Out of this number, 192 heats were represented by only one rail each; 10 heats were represented by 2 rails each; 5 heats had 3 fissured rails each; 1 heat had 4; 1 had 6; and 1 was represented by 7 fissured rails. This is an answer to the queries which commonly attend discussions of the rail problem, although as questions of metallurgical interest they have little to commend themselves. The relations between rail failures and stresses in track afford matters of greater interest. From the segregation of transverse fissures in different localities, it would seem that the places where the heats chanced to be located, and not necessarily the heats themselves, materially influenced their numbers. Five rails of one heat number were located within the range of the same milepost.

"In one instance during this period, 31 fissures occurred in 130-lb. rails in the eastbound freight track in a distance of 19 miles. The average life of these rails was 2 yr. 8 mo. Sixteen of the defective rails were found within the limits of two mile posts and 10 heats were represented at one of these.

Transverse Fissures in New York

"Railroads operating within the State of New York report to the Public Service Commission the transverse fissures which occur in that state. During the past eight years the annual number of fissures has been maintained with some increase during the last three years. The following table shows the number of transverse fissures which were reported by eight of the principal railroads. The yearly periods were from July 1 to June 30.

Railroad	1922	1923	1924	1925	1926	1927	1928
New York Central	163	135	144	165	269	254	301
Pennsylvania	11	18	13	12	7	6	12
Delaware, Lackawanna & Western	96	63	74	64	91	97	88
Delaware & Hudson	21	44	46	42	67	39	44
Buffalo, Rochester & Pittsburgh	8	9	5	15	8	12	7
Erie	4	4	1	27	37	23	44
Long Island	5	7	5	9	2	7	4
New York, Ontario & Western	16	26	21	14	22	26	25
Lehigh Valley	71	61	58	33	28	25	17
	395	367	367	381	531	489	542

Aggregate number, 3,072.

"There is no evidence of a cessation in the annual display of transverse fissures. The tendency seems to be in the opposite direction. Among these railroads the most conspicuous change in the rate of display is that of the Erie from that of digits to two-place numbers. It has been held that this abrupt change was attributable to the speeding up of freight trains. If that inference is correct, it should be given consideration by other railroads of the country. It has been felt for a long time that the speed of impact has had an important influence on the development of transverse fissures; that a greater effect from a given number of impulses by the wheels resulted from increased speeds.

"The records of the Public Service Commission show the results of the inspection of tracks of the Delaware & Hudson by the Sperry detector car. Within a period of 32 days 62 transverse fissures were discovered in 90-lb. rails. Nearly one-half the number of fissures were in rails rolled the preceding year.

"Out of this group 25 had been in the track only 10 months each. Nine rails, each 10 mo. old, were discovered by the Sperry detector car on November 20, 1929, and 10 rails which had the same age were discovered on the following day, all in the same territory. No comments were made upon the appearance of the fissures, except that their nuclei were somewhat larger than usually shown. That circumstance suggests the possibility of fabricating conditions having had an influence on their inception."

"Reciprocity" Hearings Continued

Testimony of railway officers at Boston and New York shows performance more important than traffic in purchases of Waugh draft gear

HEARINGS in the government's second "reciprocity" case, against the Waugh Equipment Company, Federal Trade Commission docket No. 1779, were continued at Boston, Mass., on June 5, and at New York on June 9 and 10. The Boston hearings were featured by the testimony of officers representing four departments of the Boston & Maine relative to purchases of Waugh-Gould draft gear by that road during and after November, 1928. Officers of the Maine Central and the Boston & Albany also appeared as witnesses.

Following a brief examination of the Maine Central men, referred to in detail below, Lawrence Richardson, chief mechanical officer of the Boston & Maine, took the witness stand. Mr. Richardson, after stating that he had had considerable experience with draft gear over a period of nearly 20 years, said that his first contact with Waugh gear was when he was employed jointly by the Virginian and the American Car & Foundry Company on development of six-wheel trucks in 1921. Since that time, when he met J. M. Waugh, and examined Waugh gears then in service, he had no occasion, he said, to inspect the company's gear until 1928.

Gear Bought on Test

Mr. Richardson then testified that in the fall of 1928 he had drawn up specifications for 500 hopper cars, subsequently purchased by the Boston & Maine. His original specifications called for Bradford or Westinghouse gear, a fact which he later explained by saying that his experience with the old Waugh gear in 1921 did not appear to justify its inclusion. In November, 1928, these original specifications were widened, giving to the Waugh Equipment Company an official opportunity and to other leading manufacturers unofficial chances to bid on gear for the 500 cars. When asked why this was done, the witness began his explanation by reference to a telegram from the late President Hannauer, but objection of counsel for respondents to introduction of any such evidence, on the ground that Mr. Hannauer could not be called for examination, was sustained at this point, forcing the government attorney to adopt a new line of questioning. A typewritten sheet, purporting to be a copy of the telegram containing this request was produced, but not admitted as evidence on objection of counsel for the respondents, based on lack of positive proof as to its authenticity. Mr. Richardson added that the B. & M. carefully checked the Waugh gear, but did not conduct any tests either before or after the widening of the specifications because reports of impartial tests conducted during 1927 and 1928 under the unbiased authority of the American Railway Association's Committee on Draft Gear at Purdue University, Lafayette, Ind., and information secured from other railroads—reports which were in all cases favorable to the Waugh gear—seemed to make such individual tests unnecessary.

The attorney for the government, E. F. Haycraft, then asked the witness to produce correspondence between himself and H. N. Ransom, a salesman of the Waugh Equipment Company. Upon Mr. Richardson's identification, a number of letters from this file were added to the record. The first was merely a request from Mr. Richardson asking Mr. Ransom to tell him the location of the Waugh Equipment Company's test laboratory, in order that "I may have the opportunity of seeing what you are developing." The second, dated November 13, 1928, was a conventional sales letter from Mr. Ransom to Mr. Richardson, asking for an opportunity "of really explaining to you our No. 402 gear, which is our standard freight gear," and expressing the hope that Mr. Richardson would visit the Waugh laboratory, where he "could obtain a very much better idea of the characteristics of the gear than from an explanation," adding that "we could not only run tests as per your wishes but could also furnish records of tests covering 49 of the prominent railroads of this country."

Mr. Richardson's reply to this letter and a second letter from Mr. Ransom, naming 25 Class I railroads on which the Waugh gear was standard equipment and stating that the Boston & Maine had been buying such gear for repairs for some time, were also accepted as evidence, as were letters from Mr. Ransom to President Hannauer. In one of these, Mr. Ransom spoke of calling on President Hannauer and mentioned his efforts to have Mr. Richardson visit the Waugh plant. This continued as follows:

> Mr. Richardson felt that the business he would give the Symington Company for other material on this order, should satisfy us, but I wish to advise you that the Symington Company is entirely distinct from ours and we can not take any credit or profit from such an order.
>
> I am awaiting advice from you as to the next move to make.

On cross examination by E. M. O'Bryan, counsel for respondents, Mr. Richardson stated that the published results of the Purdue tests, conducted on all leading draft gear by an American Railway Association committee, composed of railway engineers, and including no manufacturers' representatives, were matters of general knowledge among railway mechanical men. On further questioning, he made the statement that his 1928 specifications for hopper cars had been enlarged to include Waugh gear No. 402 upon receipt of the reports of these tests and to the contemporary arrival of knowledge of the good performance of this gear on other railroads. He further testified that the Waugh gear as tested at Lafayette, Ind., and included in his specifications, was a friction gear and an entirely different type of mechanical device from the old Waugh plate gear which he had examined in 1921. He said he had also talked with F. H. Hardin, mechanical assistant to the president of the New York Central, in regard to the Waugh gear at the time he widened his 1928 car specifications to include this gear and that he had held similar conversations with officers of other roads. He concluded his testimony with the statements that he had no connection with traffic on the Boston & Maine and that at no time had Mr. Ransom spoken to him about the possibility of giving the road any traffic in consideration

of the opening up of car specifications to include Waugh gear.

The next witness to be summoned was R. J. Heckman, chief clerk to the vice-president and general manager of the Boston & Maine and formerly executive secretary to the late President Hannauer, appearing in place of R. J. Hammond, assistant to President Hannauer at the time the transactions for purchases of Waugh gear previously referred to took place. After stating that conversations between Mr. Hannauer and Mr. Hardin on matters likely to benefit the Boston & Maine, or between Mr. Hannauer and Mr. Richardson on mechanical matters, were not at all unusual, Mr. Heckman was asked to identify papers from Mr. Hannauer's files, including letters from Mr. Ransom referred to above and a memorandum of a call made by Mr. Ransom on Mr. Hannauer. He was unable, however, to identify the copy of the telegram from Mr. Hannauer to Mr. Richardson, referred to above, requesting that specifications be enlarged to include Waugh draft gear.

P. J. Mullaney, assistant freight traffic manager of the Boston & Maine, who followed Mr. Heckman on the stand, produced statements of Armour traffic over the lines of the Boston & Maine from January, 1926, to April, 1930, insofar as such traffic was competitive with other railroads. Under examination by counsel for the respondents Mr. Mullaney stated that he was acquainted with F. W. Ellis of Armour and Company but that he did not know the other respondents or any officers or employees of the Waugh Equipment Company. He further stated that none of the respondents had ever promised to give the B. & M. any Armour traffic or to give it increased amounts of such traffic in consideration of his assistance in securing purchases from the Waugh Equipment Company, and that no threats to withdraw Armour traffic from the Boston & Maine in case such purchases were not made had ever been made to him.

Mr. Mullaney was followed on the stand by A. W. Munster, purchasing agent, who corroborated previous testimony by Mr. Richardson to the effect that original specifications for hopper cars bought in 1928 did not include Waugh draft gear, but that they had been enlarged to include such gear about November 21, 1928. This change was made by him, he added, after he had been advised by the mechanical department that President Hannauer wished Waugh gear to be included as an alternate. Following enlargement of the specifications, Mr. Munster stated, the Waugh Equipment Company submitted bids on their gear No. 402. These were later revised, but it was not until a conference between Mr. Hannauer, Mr. Richardson and himself that it was decided to buy Waugh gear. Even then, he said, the decision was made contingent upon the Waugh Equipment Company meeting the same price per car set offered by another manufacturer. Testimony showed that when Mr. Ransom agreed to meet this price the Boston & Maine gave the Waugh Equipment Company an order for 250 sets of gear, the remaining 250 sets being purchased from another manufacturer.

Specialty Purchasing Practice

A letter, written on November 22, 1928, and signed by Mr. Munster, to the Waugh Equipment Company stating that the car specifications had been widened to include Waugh gear, and asking for prices, was introduced as evidence at this point, as was the reply, quoting prices to builders, the refund to the railroad, and the original net price, subsequently revised, to the latter. Mr. Munster concluded his testimony by stating that the Boston & Maine later bought 400 sets out of a total of 1,000 sets for new cars ordered in June, 1929, and 500 sets out of a total of 1,000 sets for cars ordered in October, 1929, both orders being determined as a result of conferences between President Hannauer, Mr. Richardson and himself.

On cross examination, Mr. Munster stated that the quoting of one price for gear to car builders and of a lower price to the railroad was not at all uncommon in the trade. Neither, he added, was the meeting of competitive prices by a specialty manufacturer unusual, although he hesitated to call it a general practice. He did not feel, he said, that the practice followed by the Waugh Equipment Company in November, 1928, in first revising its bid and then meeting a still lower competitive price could be considered uncommon or peculiar to that firm. Mr. Munster further stated that while no officers or employees of the Waugh Equipment Company or of Armour and Company had ever talked with him about traffic matters, it was not unusual for companies in certain lines of business to promise traffic in return for purchases, adding that lumber, coal and cement companies often adopted this course in trying to sell their products to a railroad.

Officers of the Maine Central who appeared at the hearing, as mentioned above, were Lucian Snow, freight traffic manager, Eugene Decker, purchasing agent, and P. M. Hammett, superintendent of motive power. Mr. Snow presented statements of Armour traffic moving over the Maine Central, while Mr. Decker said that his road had bought no draft gear from the Waugh Equipment Company during the last five years. Mr. Hammett testified that when he had last prepared specifications for new cars he had widened them, after failing to obtain a favorable price on the gear first named, to include five nationally known draft gear. The Waugh Equipment Company was given a chance to bid at this time, but the order was placed with another manufacturer. Under cross examination, Mr. Hammett stated that no representative of Armour and Company had ever promised him to give traffic to the Maine Central or threatened to withdraw such traffic in consideration of purchases of Waugh gear.

The last witness to appear at Boston was R. A. Van Ummersen, freight traffic manager of the Boston & Albany. After producing statements of Armour traffic moving over his road between 1925 and 1929, Mr. Van Ummersen testified that there might be many factors affecting the traffic received by the Boston & Albany, or by any other railroad, from Armour and Company or its subsidiaries. He also asserted that he had never been approached regarding increased traffic in return for his assistance in securing purchases of Waugh draft gear.

Hearings Continued at New York

Like the Boston hearings, those which were held at New York on Monday and Tuesday, June 9 and 10, were devoted mainly to the testimony of railway purchasing, mechanical and traffic officers concerning purchases and tests of Waugh draft gear and traffic relations between the roads and the various respondents. Representatives of the Delaware, Lackawanna & Western, the New York, New Haven & Hartford, the Lehigh Valley, the New York Central, the Erie and the Chesapeake & Ohio were questioned during the two-day session, while the oustanding facts obtained were the generally satisfactory mechanical performance of the Waugh gear and the absence, so far as most of the witnesses were concerned, of any traffic considera-

tions in draft gear purchases. Additional evidence relative to the organization, in 1924, of the Waugh Equipment Company, was also received to supplement similar facts brought out at the original hearing at Buffalo, N. Y. (reported in the *Railway Age* of June 7, page 1373).

Service Tests on Lackawanna and New Haven

J. M. Davis, president of the Delaware, Lackawanna & Western, was the first witness called at New York. He testified that in May, 1926, F. W. Ellis, vice-president of Armour and Company and one of the respondents in the case, had told him of being interested in the Waugh gear, and suggested that the Lackawanna test it, after which that road bought a number of such gear, along with other nationally known makes, for test purposes. Later, on cross examination, the witness stated, as an additional reason for such test purchases, that only one gear was in use on the Lackawanna in 1926, so that more competition was felt to be desirable. Mr. Davis again talked with Mr. Ellis about draft gear in 1927, when the same procedure as in 1926 was followed in buying 200 sets of Waugh gear, as well as gear of other types. Under further cross examination the witness stated that questions of traffic or price were never raised in his conversations with Mr. Ellis, whom he had known personally for some 15 years. He also asserted that the results of service tests conducted by the Lackawanna proved so favorable to the Waugh gear that it is now in regular use on that road as one of two standard gear. Mr. Davis' concluding statement was to the effect that it is the policy of the Lackawanna to buy from firms located on its lines, provided quality and price are satisfactory; and that the Waugh plant is so located.

Mr. Davis was followed on the stand by three other officers of the Delaware, Lackawanna & Western. C. C. Hubbell, purchasing agent, listed his company's purchases of Waugh freight gear as follows: 1926, 100 sets; 1927, 200 sets; 1928, 50 sets, and 1929, 550 sets. He also corroborated testimony received at Boston from A. W. Munster of the Boston & Maine to the effect that in buying car specialties it is customary to ask the price to the builder, and the allowance, or lower net price, to the railroad. It is also customary, he added on cross examination, to trade on these bids, with the idea of securing a still lower price if possible.

C. J. Scudder, superintendent of motive power, confirmed testimony by Mr. Davis to the effect that heavier equipment put into use by the Lackawanna in 1926 made it advisable to try out new gear to see if a better gear than its standard at that time was available. Service tests conducted under his supervision, laboratory tests witnessed by him, and the later reports of the draft gear tests at Purdue University, in all of which the Waugh gear received a high rating, were instrumental, he said, in making that gear one of their standards. J. J. Byrne, general freight traffic manager, presented statements of Armour traffic moving over the D., L. & W. from 1925 to 1929. On cross examination he confirmed testimony given by Mr. VanUmmersen at Boston, that there is no definite way of measuring traffic moving from a packing house.

All three witnesses denied ever having discussed traffic in relation to purchases with Messrs. Meeker, Ellis or Scott, or with any officers or employees of the Waugh Equipment Company, although Mr. Byrne said he had discussed legislative and rate questions with Mr. Meeker.

The first New York, New Haven & Hartford witness to be called was J. J. Pelley, president. He mentioned conversations with F. W. Ellis in 1927 or 1928 and with J. B. Scott, another of the respondents, in April, 1929, in the course of which both men had mentioned that the Waugh gear was meeting with considerable success and that Mr. Pelley's road might be interested in looking into it. The witness added, however, that he considered both calls as of a social rather than of a business nature, with any mention of draft gear merely incidental, and further stated that he had authorized no draft gear purchases while with the New Haven.

Benjamin Campbell, vice-president in charge of traffic of that road, followed Mr. Pelley. The greater part of his testimony was devoted to identification of letters and memoranda from the inter-office correspondence of the New Haven. With the exception of one letter written by F. W. Ellis introducing A. J. Pizzini, president of the Waugh Equipment Company, to Mr. Campbell, none of this material was added to the record. Mr. Campbell further testified that he had been informed by the purchasing department on two occasions in 1927 when the New Haven had bought small lots of Waugh draft gear, and had subsequently informed Mr. Ellis of these purchases, but that nothing had ever been said to him to indicate that Armour traffic over the New Haven would be increased in consideration of these purchases or withdrawn if they were not made.

W. J. Landon, assistant general freight agent of the New Haven, who appeared in place of G. M. Wood, freight traffic manager, produced statements of Armour traffic handled by the New Haven, after which C. R. Painter, purchasing agent, took the stand. His testimony showed that his road had used Miner gear almost exclusively until a year or so ago, but that since that time draft gear had been obtained on competitive bids. New Haven purchases of Waugh gear, according to statements produced by Mr. Painter, totaled 106 car sets in 1927, less than 50 sets in 1928, and 356½ sets in the first four months of 1930, at which time these gear were priced lower than any competing types. C. E. Smith, vice-president in charge of purchases and stores, appeared as a voluntary witness at this point. The policy of obtaining competitive bids on all new equipment bought by the New Haven was inaugurated, with President Pelley's approval, Mr. Smith testified, when he assumed his present office in September, 1929, to prevent any one manufacturer from thinking that his products were standard on that road and fixing prices accordingly.

G. A. Moriarty, general mechanical superintendent, J. C. Hassett, mechanical enginer, and S. L. Swett, lubricating specialist, were the last New Haven witnesses to be called. Messrs. Moriarty and Hassett testified that representatives of the mechanical department had witnessed laboratory tests of Waugh gear at the company's plant, Depew, N. Y., and had applied 177 sets of Waugh gear to cars and locomotives in 1928 and 1929 for service test purposes. Although these gear are still being followed in service, their performance to date has been sufficiently satisfactory to warrant the mechanical department in recommending their purchase in 1930. Mr. Swett described his part in making tests of Waugh gear for his road, stating that he had witnessed laboratory tests at Depew and had examined some 25 sets of such gear in service on Chicago & North Western cars in December, 1928.

Like the Lackawanna representatives, all the witnesses appearing for the New Haven testified that they had never been approached by the individual or corporate respondents with offers of traffic in return for purchases of Waugh gear or with threats to withdraw such traffic if the gear were not bought.

At the request of the government attorney, J. Duffy, traffic vice-president of the Lehigh Valley, produced correspondence between F. W. Ellis and the late J. A. Middleton, former vice-president of the Lehigh Valley. This file, which was added to the record, contained letters introducing Mr. Pizzini to Mr. Middleton, a statement that the Waugh gear had been approved by the Lehigh Valley mechanical department, and a copy of a memorandum, signed with a rubber stamp, from former traffic manager C. A. Blood to E. J. Henry, western traffic manager, informing him that the Lehigh Valley had ordered 250 sets of Waugh gear and directing him to "note and use to best advantage." Mr. Duffy concluded with the statement that he had had no personal negotiations with regard to Armour traffic or Waugh draft gear.

H. J. McQuade, purchasing agent, and G. H. Foster, vice-president in charge of operations, both of the Lehigh Valley, then testified that that road specified Waugh gear for 857 cars out of a total of 3,502 purchased since December, 1926. They also described their methods of buying draft gear and other specialties which were substantially the same as those used by other lines represented at the hearings, except that Mr. Foster testified that it was not unusual for him to discuss purchases with the traffic vice-president. J. P. Laux, superintendent of motive power, reported that results obtained from the Waugh gear in service warranted his department in recommending its purchase in 1929 and in specifying it as the standard gear for 500 cars ordered in May of that year. On cross examination, he testified that while friction gear were specified for freight service, the old Waugh plate gear was by no means obsolete, but was still used in passenger service. The taking of testimony from officers of the Lehigh Valley was concluded after E. Laughton, auditor of traffic, produced records of Armour shipments over that road in 1929.

Representatives of the New York Central were the next witnesses to be called, beginning with G. H. Ingalls, vice-president in charge of traffic. It appeared from his testimony that while calling on F. W. Ellis in the course of business in the spring of 1927, Mr. Ellis had mentioned his interest in the Waugh Equipment Company, and expressed a hope that the New York Central would buy some of its gear. Mr. Ingalls then said he told Mr. Ellis that he had nothing to do with purchases, but would see if the Waugh Equipment Company could be given a chance to bid. He also testified that he was subsequently instrumental in arranging a conference between Mr. Ellis and F. H. Hardin, mechanical assistant to the president of the New York Central, and W. C. Bower, vice-president in charge of purchases and stores. This was the only time, Mr. Ingalls added, that Mr. Ellis ever sought his co-operation in interesting other New York Central officers in mechanical devices, while on cross examination he added that Mr. Ellis, although mentioning the successful use of Waugh gear on Armour cars, never promised to give the New York Central increased traffic or to withdraw traffic contingent upon purchases of Waugh gear.

The last witness to appear on Monday, June 9, was W. C. Bower. His records showed that Waugh gear had been used in moderate quantities in passenger service on the New York Central at all times during the last five years, but that extensive use of Waugh freight gear dated only from 1929, when the mechanical department rated the Waugh gear equal to Miner and National gear as a New York Central standard. This was not, however, the first occasion on which the Waugh Equipment Company had competed for New York Central business.

Testimony from New York Central men was continued at the opening of the Tuesday hearings, with H. W. Faus, engineer of tests, on the stand. In summarizing exhaustive tests of freight draft gear conducted by his department in 1925 and 1926, reports of which were added to the record, Mr. Faus stated that the only Waugh gear included in the test, spring plate gear type S-16-R, proved unsuitable for use on heavy freight equipment, but that he would consider it satisfactory for light equipment or for passenger service. On cross examination he stated it as his belief that these New York Central tests were the first full draft gear tests ever conducted, characterizing them as being more complete than those made by the Railroad Administration. Passenger tests subsequently conducted on modifications of the S-16-R type showed it to be satisfactory for that service, he added, with the result that it is now one of the New York Central's standards on passenger equipment.

When asked if he would consider the Waugh gear tested by him in 1925-1926 obsolete, he answered that it was obsolete on his road for new equipment only, and that it was not generally considered obsolete, to the extent that when tests were made at Lafayette, Ind., other gear which were much less satisfactory for freight service were included. On further cross examination, he stated that foreign cars and those owned by the Armour Car Lines moving over the New York Central were in many cases equipped with Waugh spring plate gear, that they gave satisfactory service and showed no tendency to break down. In reply to a question by the government attorney, however, he stated that breakdowns were by no means the sole test of a gear's efficiency.

D. L. Gray, vice-president of traffic, and T. E. Savage, assistant to manager of purchases, who appeared for the Erie, presented statements of Armour traffic over that road and described the purchasing methods used, respectively. Both witnesses denied ever having had any conversations with any of the respondents in regard to traffic or its possible effect on purchases.

C. & O. Testimony

W. J. Harahan, senior vice-president of the Chesapeake & Ohio, was the next witness to be summoned. He testified that prior to June 1, 1929, he had exercised general supervision over draft gear purchases but since that time had had nothing to do with them. While such matters were under his jurisdiction, he added, gear had been tested by the mechanical department under the supervision of J. W. Small, chief mechanical officer, after which the gear were bought on bids obtained through the purchasing department. He said he had discussed the general subject of draft gear purchases with J. J. Bernet, then president of the Erie, in December, 1928, but simply as one executive with another.

On further examination by the government, Mr. Harahan testified that he ordered tests of Waugh draft gear because information reaching him from other sources indicated it mechanically worthy of consideration, provided price was right. These two factors, he emphasized, were of primary importance. Asked if other factors were considered, he answered that it was also deemed advisable to consider the gear for reasons of business policy, such as "reciprocity." On further questioning by the government, he enlarged this point by saying that he had been given to understand that people interested in the Waugh Equipment Company were also connected with Armour and Company and therefore in a position where they might be able to give the Chesapeake & Ohio some reciprocal benefit in return for use of Waugh products.

Although he mentioned this as one of the subjects of his conversation with Mr. Bernet in 1928, he stressed the

facts that he personally had no definite understanding or knowledge on this point, that no arrangements were made and that the Chesapeake & Ohio was never solicited for purchases on a "reciprocal" basis. On cross-examination, Mr. Harahan testified that the Chesapeake & Ohio bought no gear from the Waugh Equipment Company while the matter was under his jurisdiction prior to June 1, 1929, and that he had never been approached by any of the respondents with promises of traffic if his road bought Waugh gear or with threats to withdraw traffic if it did not buy them.

Other Chesapeake & Ohio witnesses were J. W. Small; S. B. Andrews, engineer of motive power and C. & O. member of the mechanical advisory committee of the VanSweringen lines; G. H. Taylor, general car inspector, and F. I. Mariott, assistant foreman, physical laboratory. The principal testimony, in all cases, dealt with a test of Waugh gear No. 402 made at Mr. Harahan's request in January, 1929, at the Chicago laboratory of W. H. Miner, Inc. As a result of these tests, another gear was recommended for use on the railroad, although the Waugh gear was not listed as unsatisfactory, and was specified for use on locomotives ordered early in 1930.

Organization of Waugh Equipment Company

The only non-railroad testimony presented at the hearing was received on Monday afternoon from Thomas Bragg, New York broker, who had assisted in the organization, in 1924, of the Waugh Equipment Company. Mr. Bragg testified that when he and Mr. Pizzini formed the Waugh Equipment Company as a reorganization of the Waugh Draft Gear Company, preferred stock in the new company was given to officers, while 7,000 shares of common stock were distributed as follows: 2,000 shares to stockholders of the Waugh Draft Gear Company, and 5,000 shares divided, one-third to himself, one-third to Mr. Pizzini, and one-third to F. W. Ellis and Arthur Meeker. This division of stock, he said, was determined as part of the plan of reorganization drawn up by Mr. Pizzini and himself. Asked to tell why common stock had been given to Messrs. Ellis and Meeker, the witness replied that it was to ensure sales to Armour and Company of draft gear for the 8,000 cars of the Armour Car Lines—business which would give the new Waugh Equipment Company funds needed for working capital and development work.

In his knowledge, however, nothing was said at any time about any assistance to be given by Armour officers in making sales of draft gear to railroad companies, and no reference was made to any use of Armour traffic for this purpose. He did not recall ever having stated that this stock was given to Messrs. Ellis and Meeker in return for their use of Armour's traffic influence, nor did he know whether or not they had ever solicited draft gear purchases from railways. When asked by the government how contact between the Waugh Equipment Company and officers of Armour and Company came about, the witness said that he had known Mr. Meeker for some time, but that he and Mr. Pizzini were approached by Messrs Meeker and Ellis in regard to a part in the reorganization. Mr. Bragg stated that he had personally sold several hundred sets of Waugh gear during his connection with the company, but that he had sold all his stock early in 1926, because he had no desire to retain any personal interest in the draft gear business.

On cross examination, Mr. Bragg repeated his previous statement that Messrs. Ellis and Meeker had first broached the subject of participation in the reorganization to Mr. Pizzini and himself.

The hearings adjourned on Tuesday, June 10, to convene in St. Louis, Mo., on June 13.

Portable Electric Adding Machine, Weight 25 lb.

THE adaptation of electricity to the Burroughs portable adding machine, without increasing its size or sacrificing compactness or portability, is announced by the Burroughs Adding Machine Company. The machine's original proportions are maintained, the motor being built into the mechanism without enlargement of the case. The motor will operate from any electric outlet, on direct or alternating current, on any voltage and range of cycles.

The new machine does much of the work automatically and is considerably faster than the hand-operated machine. A simple operating bar, which operates at a touch of the finger, takes the place of the adding machine handle. The machine itself weighs about 25

The New Burroughs Electric Portable Machine

pounds and it is being produced in styles and capacities for various uses, as is the hand-operated portable which is being continued.

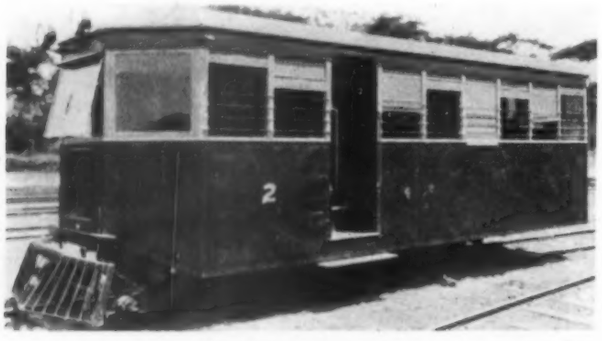
The electric portable is designed for desk and general office use where fast, light machines are desired but have not been available; and in operations where the hand-operated machine has been found efficient but where the greater speed and ease of electricity promise economies. Adding electricity to the portable machine gives it much of the operating efficiency and calculating range of the larger electrically-operated units. Subtotals and totals are taken simply by pressing the desired keys. It is not even necessary to press the operating bar. Electric consumption is minimized since the motor operates and current is used only when the motor bar is depressed.

DAMAGE amounting to $750,000 was done to physical property of the Southern Pacific of Mexico by the revolutionary activities in Mexico in 1929, according to a recent estimate of that company.

Koppel Converts Dodge Chassis to Railway Use

EQUIPMENT necessary for the conversion of Dodge Brothers truck chassis into railway motor cars for passenger service has been developed by the Koppel Industrial Car & Equipment Co., Koppel, Pa. The conversion is effected by removing unnecessary equipment from the Dodge standard truck chassis and installing heavy-duty reversing high-speed transmissions, larger gasoline tanks, larger generators and batteries for increased lighting, frame outriggers, etc. Early models were constructed to carry 10 and 12 passengers on the Dodge ¾-ton chassis, while more recently completed chassis are offered for Dodge models ranging from ¾ to 3 tons. When used in connection with special trailers, this equipment may be obtained to carry from 12 to 75 passengers or from 1 to 15 tons of freight.

A swivel-type, four-wheel pony truck with wheels 18 in. in diameter and a wheel base of 38 in. is furnished for the front end of the chassis for service on standard-gage track. The truck frame and the bolsters are of all-steel construction and rubber shock-absorbing cushions enclosed in steel holders are provided to absorb the initial shock transmitted from the wheels. The pilot is constructed entirely of steel and is attached to the frame of the pony truck.

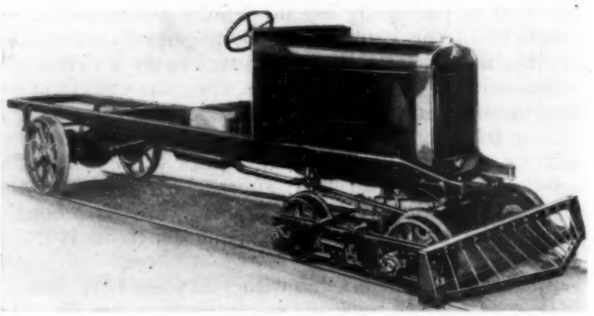


A Body Built for Passenger Service on One of the Dodge Chassis

Rear-end equipment consists of 30-in. drive wheels of forged steel with standard chilled treads and flanges, which are machined to fit the standard Dodge hub in place of the regular pneumatic tires. Three independent brake systems are provided, completely assembled for rail service: The regular foot-operated, hydraulic brake which is applied on the driving-wheel brake drums; the usual emergency hand brake applied on the propeller shaft; and the four-wheel hand brake applied through the steering wheel to the pony-truck wheels.

Mead rubber-cushion drive wheels are recommended for passenger service. These wheels are said to add to the comfort of the passengers by reducing the noise and vibration resulting from the contact of the wheels on the rails. In addition, they are said to increase the life of the equipment and to reduce the fatigue of the operator on long runs. They are furnished only with rolled steel tires. Other Koppel equipment includes foot-operated sanders for the drive wheels and link-and-pin connected, radial plain-head or automatic couplers with spring draft gear.

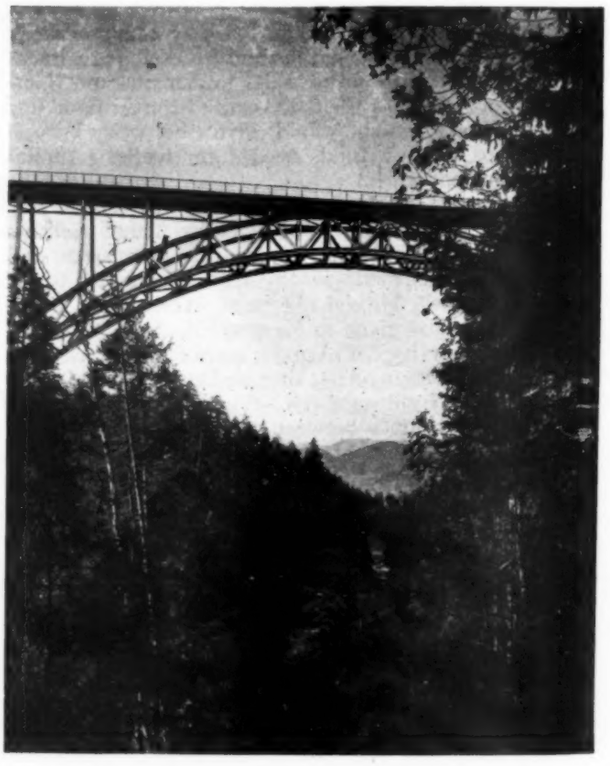
This equipment is available for track gages as high as 66 in., although for gages less than 50 in. it is necessary to revise the rear spring arrangement of the chassis and to replace the rear axle housing and driveshafts by shorter ones corresponding with the track gage. For track gages of 56½ in. or more, the equipment is so designed that it can be applied to the chassis by any Dodge dealer, while, if equipment for any track gage less than 50 in. is desired, it is necessary to ship the chassis to the Koppel factory for rebuilding and mounting of the flanged wheel equipment. Since these motor cars are used in countries scattered widely throughout the world, where types of transportation service differ considerably and where track gages vary to a large extent, no attempt has been made to standardize on any particular design of body.



A Dodge Chassis Furnished with Koppel Flanged Wheel Equipment

These cars are handled by the world-wide organization of Dodge Brothers, whereby stocks of spare parts are readily available from Dodge dealers. Installations of this equipment which have been in service in this and foreign countries for some time have shown satisfactory service.

* * *



Wilse, Oslo

Hjuksebö Bridge, on the Notodden Line of the Norwegian State Railways

Looking Backward

Fifty Years Ago

The Savannah & Charleston [now part of the Atlantic Coast Line] was sold at Charleston, S. C., on June 7 for $300,200, the purchaser being H. B. Plant acting for the bondholders. The road extends from Savannah, Ga., to Charleston, S. C., 106 miles.—*Railroad Gazette,* June 11, 1880.

The question of fast trains between Chicago and New York and of shortening the time between the Missouri river and Chicago has been amicably settled by the managers of the roads involved. It has been decided to continue the new trains, leaving Chicago at 3:30 o'clock in the afternoon and reaching New York at about 10 o'clock the next evening. In order to make connections with the eastern trains the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Chicago & Alton will shorten their time from the Missouri river to Chicago by more than an hour. The Michigan Central, the Lake Shore & Michigan Southern [now part of the New York Central] and the Pittsburgh, Ft. Wayne & Chicago [now part of the Pennsylvania] will each continue to operate four trains a day to New York.—*Railway Age,* June 17, 1880.

Twenty-Five Years Ago

C. T. O'Neal has been appointed trainmaster of the Pennsylvania division of the Lehigh Valley, with office at Sayre, Pa.—*Railway Age,* June 16, 1905.

On June 11 the first 18-hour schedule between New York and Chicago was inaugurated by the Pennsylvania over a route reduced by strengthening of lines and the use of the West Philadelphia cut off, to 905 miles. This requires an average speed of 50.28 m.p.h., without deducting for nine full stops, consuming 39 min., and without allowing for reduced speed of the Jersey City ferriage. An average running speed of 54 m.p.h. is required for the entire distance.—*Railway Age,* June 16, 1905.

Ten Years Ago

George H. Emerson has been appointed chief of motive power and equipment of the Baltimore & Ohio, with headquarters at Baltimore, Md. George F. Hess, superintendent of machinery of the Kansas City Southern, has been appointed superintendent of motive power of the Wabash, with headquarters at St. Louis, Mo.—*Railway Age,* June 11, 1920.

Through trains and the resumption of pre-war schedules recently announced by several of the western roads include the North Coast Limited of the Northern Pacific between Chicago and Seattle, Wash.; a through sleeping car between New Orleans, La., and Denver, Colo., over the Southern Pacific, the Fort Worth & Denver City and the Colorado & Southern; and the Great Northern's Oriental Limited, which made its initial trip on May 30.—*Railway Age,* June 11, 1920.

In spite of another attempt on the part of "outlaw" strikers (this time including enginemen, firemen and switchmen) to cause a complete tieup of freight traffic in the Chicago Terminal district, car movement and the general labor situation show little change. Out of the total number of employees who were ordered to strike by the officers of the seceding railroad union, only 200 men actually quit work. Reports from Kansas City say that the confusion growing out of the switchmen's strike has been cleared; but the general shortage of cars has made it impossible to place cars for grain shippers in proper supply.—*Railway Age,* June 11, 1920.

New Books

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Hobo's Hornbook, collected by George Milburn. An annotated collection of ninety tramp and hobo ballads in which, necessarily, railroads and railroad personnel figure to a large extent. "The Lehigh Valley Sequence" and "The Gila Monster Route" are included, along with a glossary which translates hobo and railroad slang. 280 p. Published by Ives Washburn, New York City, $3.

Lay-Off and Its Prevention. A study of fluctuations in labor requirements, methods of stabilizing the working force, and lay-off procedure. 86 p. Pub. by National Industrial Conference Board, Inc., New York City, $1.50.

The Seventh Annual Green Book Containing Report on Third Award Railroad Employees' National Safety Contest, Class I Railroads, Year 1929. Report developed by Lew R. Palmer. "Contest Plan" p. 3. The winners by groups were: A—Union Pacific System; B—Union Pacific Railroads; C—Oregon-Washington Railroad & Navigation Company; D—Los Angeles & Salt Lake Railroad Co.; E—Gulf, Mobile & Northern; F—Duluth & Iron Range; G—Conemaugh & Black Lick Railroad; H—Chicago Central Zone, Pullman Co. 20 p. Pub. by National Safety Council, Chicago, Illinois, *Apply.*

The Stabilization of Employment, by L. F. Loree. Address to the convention of the Metal Trades Association. The elastic work day as in force on The Delaware and Hudson. 13 p. Pub. not given but probably available from The Delaware and Hudson Railroad Corporation, New York City. *Apply.*

Periodical Articles

Efficiency and Unemployment, by L. E. Keller. A study of recent railroad statistics in relation to employment situation. American Federationist, June 1930, p. 676-680.

Motor Road Services in the Union of South Africa, by DuWayne C. Clark. The motor road services are instituted by the railway administration. ". . . . . the open mileage covered by the rail system is approximately 13,000, and that system has been developing for 67 years. The road motor service was begun only six years ago, yet at the present moment it covers over 12,000 miles." Commerce Reports, June 9, 1930, p. 647-648.

Railway Conditions in Manchuria, by John J. Ehrhardt. "Chinese railways are divided into two groups—those under the Minister of Communications at Mukden, and those operated under the Minister of Communications at Nanking." This article, which is illustrated and accompanied by a map of Manchurian railways discusses the Manchurian lines' operations in 1929. Commerce Reports, June 9, 1930, p. 649-651.

Seeing By Telephone, by Herbert Brucker. An illustrated article on recent developments in television. Review of Reviews, June 1930, p. 56-58.

The Men in the Railroad Mergers, by L. B. N. Gnaedinger. "In devising a plan of consolidation, the Interstate Commerce Commission has become arbiter to personalities diverse as any arrayed in the turbulent history of American railroading." World's Work, June, 1930, p. 32-35, 110-112.

Odds and Ends of Railroading

Hog-Raising Champion

A. J. Johnson, hostler for the Chesapeake & Ohio at Shelby, Ky., claims the railway hog-raising championship. He recently slaughtered one of his hogs that weighed 843 lb.

Performance Record

The crew of rail motor car 501, operating over the Missouri Pacific between Mineola, Texas, and Troup, are claiming an unequalled performance record for their car. In 1928, it missed connections only once, because of a broken band on the generator. While during 1929, and so far in 1930, the car has not missed any connections.

Corporation Fees

The second largest fee ever collected by the corporation department of the office of the secretary of state of Illinois, $64,713.51, was paid by the Chicago, Rock Island & Pacific recently for renewing and extending its articles of consolidation for 50 years from June 3, and for increasing its capital stock by $30,000,000. The largest single fee was $300,045, which was paid by the New York Central in 1914.

Model Train for Chicago Fair

V. D. Fuller, car inspector for the Pennsylvania at McCullough yard, Norwood, Ohio, is constructing a model freight train, hauled by an electric locomotive, together with a section of track, block system, stations, bridges and tunnels for exhibition at the Century of Progress in Chicago in 1933. Up to the present time Mr. Fuller has completed the construction of the locomotive and six cars and it will require nearly 18 months to complete the train, which will consist of a locomotive and 13 cars.

Dutch Engineering Troubles

One would imagine that, in a flat country like Holland, maintenance men would have an easy job. This, however, is only relatively true. Bridge and drainage problems abound, since the country is honeycombed, not only with natural waterways, but with numerous canals. The main line between Utrecht and Hertogebosch, a distance of about 40 miles, is practically all on bridges and embankments. East of Utrecht, a totally different maintenance problem is encountered. Between Amersfoort and Apeldoorn, on the main line between London and Berlin, a stretch of sand dunes is traversed. In many cases, cuts as deep as 30 ft. were necessary. To keep the sand from over-flowing the tracks, the faces of the cuts have been planted with a species of tough, wiry grass. It was necessary to haul soil from other portions of the country, and place it as an overburden on the sand before the grass would grow.

Railroading Checks Off a Thrill

Railroad travel is losing some of its olden tang, even while acquiring new thrills in the shape of air-rail combinations, whereby one may change, mid-journey, from a sleeping car to a cloud caboose. One lost tang is the possibility, or we may say the privilege, of falling out of an upper berth.

The other day we walked the full length of the interior of a magnificent new train being exhibited to visitors, prospective travelers, bus riders and the proletariat at the Union station. We started in at the luxurious leading car and gradually worked back to Chicago. One thing struck us forcibly. That was a safety net for denizens of upper berths.

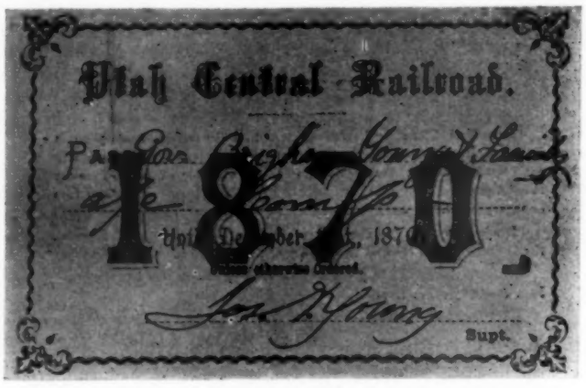
Once snuggled in your cozy bunk under the car aaves. the new safety net makes it impossible for you to float off into space when the engineer suddenly throws in the clutch. The new invention is a net loss to thrill seekers. Never again, alas, shall we demonstrate our ability to hit the center aisle in one fall and purple, striped shorties, while George the porter mumbles about an unusually heavy shower of upper-deck passengers.—Gene Morgan, Chicago Daily News.

Brigham Young, Railroader

MERCED, CAL.

TO THE EDITOR:

The Utah Central was built by Brigham Young and the Mormon church and was subsequently acquired by the Union Pacific. When the records of the old Utah Central



Brigham Young's Pass

were turned over to the Union Pacific, this pass, among other papers that were to be destroyed by fire, was salvaged by G. H. Nickerson, chief engineer of the Yosemite Valley, who was at that time general roadmaster of the Union Pacific at Salt Lake City, Utah.

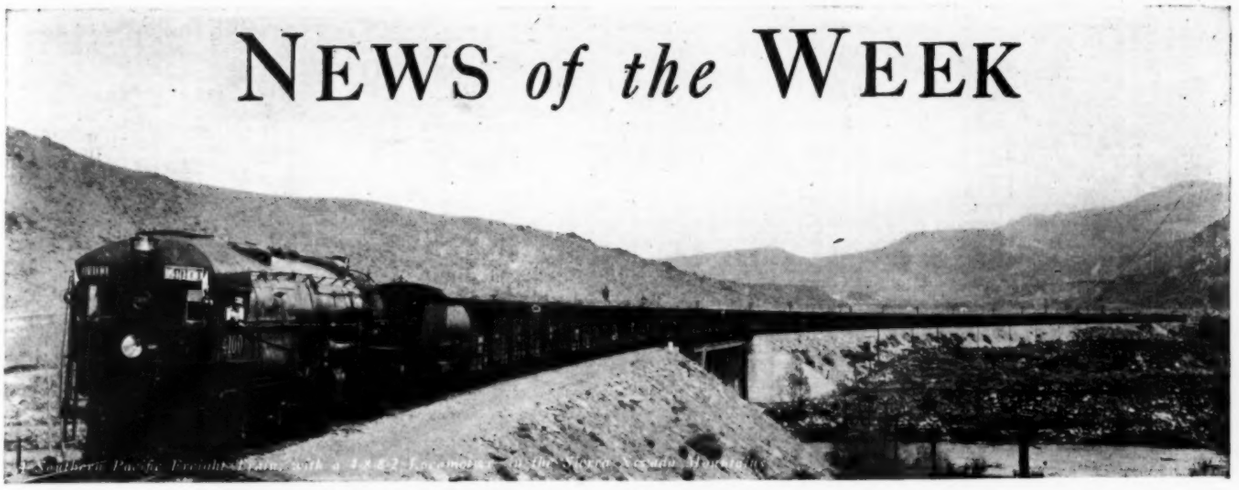
W. L. WHITE,
General Manager, Yosemite Valley.

Crisis in Radio

Accuracy first, or nearly first, is the watchword of Radio. Living up to this ideal caused a tense few minutes at the National Broadcasting Company's studio on Fifth avenue recently. A final rehearsal was being held of "The Empire Builders," which is a program sponsored by the Great Northern. During the course of this tryout, with the time for actual broadcasting only 15 min. off, someone said he had never heard a train whistle like the one they were using. This whistling noise came from a phonograph record especially prepared by the railroad people and forwarded here. Such a doubt about the authenticity of the sound, arising with only 12 or 13 min. to go, unmanned a lot of the personnel, but the production manager, Raymond Knight, did not lose his head. He calmly reached for the telephone. He put in a rush call for St. Paul, Minn., and appealed to the Great Northern officers who were assembled there listening to the final rehearsal over a special wire. "That train whistle, just as it goes into the tunnel—was it right?" Mr. Knight asked. "It seemed shrill and funny to us here." "The whistle is right," pronounced St. Paul, and explained: "you see, it's not a regular steam whistle. That is a work train, and it is backing into the tunnel. When a work train backs into a tunnel that's the way the whistle sounds."

This, of course, set everyone's mind at ease. The program proceeded, while a platoon of property men removed a wide variety of apparatus which had been assembled around the microphone for possible use in the event that the whistle hadn't been right.—The New Yorker.

NEWS *of the* WEEK



A Southern Pacific Freight Train with a 4-8-4 Locomotive in the Sierra Nevada Mountains

JOHN L. SMITH, of Jackson, has been appointed a member of the Mississippi Railroad Commission, succeeding S. B. Alexander, resigned.

THE TOLEDO, OHIO, UNION STATION, serving seven railroads, was destroyed by fire on June 10; the damage was estimated at approximately $100,000.

THE VETERANS ASSOCIATION of the Northern Pacific held its annual meeting at Portland, Ore., on June 12 with about 500 veteran employees in attendance from over the entire system.

SENATOR COUZENS, on Wednesday, June 11, introduced in the Senate resolutions authorizing the Committee on Interstate Commerce to investigate the matter of railroad consolidation and unification and their effects on public interests, for the purpose of obtaining information as a basis of legislation.

OLIVER D. CHALMERS, former manager of mail and express traffic of the St. Louis-San Francisco, who confessed to misappropriating $150,000 of railway funds, was sentenced at St. Louis, Mo., on June 6 to serve seven years in the Missouri Penitentiary. He received concurrent sentences of five years each on two second degree forgery charges and concurrent sentences of two years each on two embezzlement charges.

THE INTERSTATE COMMERCE COMMISSION has issued an order making effective on July 1 its order of November 4, 1929, forbidding railroads to haul other roads' business cars free. The effective date had been postponed from time to time pending proceedings in the district court for the western district of Kentucky in which several of the railroads sought an injunction to restrain the enforcement of the order. A decision sustaining the commission's order was rendered on May 28, as reported in last week's issue.

THE FEDERAL RADIO COMMISSION on June 10 ordered the cancellation of the licenses of the radio transmitting stations of the Pere Marquette and Ann Arbor, operating in the Great Lakes area, on the ground that they do not comply with the general public service policy of the commission. The commission denied the applications of the companies for renewal of licenses to maintain operations on eight low-frequency channels in general public coastal service and private point-to-point service on Lake Michigan and between five land stations. The commission is fostering the policy that radio should be allocated for public utility service and Chairman Robinson explained that these stations were used essentially for private point-to-point communication in connection with railroad operations.

Grade Crossing Accidents

Accidents at highway grade crossings in the first two months this year resulted in 320 fatalities, a reduction of 83 compared with the corresponding period in 1929, the American Railway Association announces: persons injured, 1,054, a reduction of 34.

Freight Claim Agents at Seattle

Over 400 representatives of the railroads and members of their families attended the thirty-ninth annual session of the Freight Claim Division of the American Railway Association, held at Seattle, Wash., on June 10 to 13. The four day meeting was devoted to discussions of the various phases of loss and damage as well as to the consideration of claim prevention work. In addition the program included several addresses by railroad and industrial executives. A shipper-carrier luncheon, sponsored by the Pacific Coast Claim Conference and the Freight Claim Division, was held on the third day.

Comments on Howell Bill Sought

The Senate committee on interstate commerce has decided not to hold hearings on the Howell rate base bill until the next session of Congress, which begins in December. As a preliminary to such hearings it decided, at a meeting on June 6, to send letters to shippers, railroads and others interested in the bill asking for written comment and constructive criticism, to be submitted by the middle of August. Following the receipt of replies the committee expects to work out some plan for summarizing the replies with the co-operation of the Interstate Commerce Commission, so that they may be studied before the hearings.

Safety Rules for Track Cars

Track cars—motor, hand and push—are the subject of a circular which has been issued by the National Safety Council (Chicago). It is a six-page pamphlet illustrated with a dozen cuts, summarizing the combined experience of a large number of users with a view to providing material for a model code of rules for care and operation. This circular is No. "R R-1" of the "Industrial Safety Series" and it embodies the views of safety specialists as to the best precautions that can be taken by track-car operators against injury to employees or to wayfarers at highway crossings.

Veterans Visit Washington

The Veterans' Association of the Middle Division of the Pennsylvania enjoyed its annual outing on Saturday, June 7, by an excursion to Washington. The total number on the train, including members of their families, was about 300. The train left Altoona, Pa., at 3 a. m., and arrived at Washington about noon. The excursionists had luncheon at the restaurant in the Union Station and then went sightseeing in motor coaches. They returned to the station at 4:15 p. m., indulged in further sightseeing, left at 5:15 and reached home, (Altoona), at 11:15 p. m.

Hearings on Couzens Resolution Urged

The Representatives in Congress from Minnesota, who are trying to prevent the proposed Great Northern-Northern Pacific unification, have addressed a letter to Chairman Parker of the House committee on interstate and foreign commerce urging that the committee hold hearings on the Couzens resolution, recently passed by the Senate, to suspend the powers of the Interstate Commerce Commission to authorize railway unifications, with certain exceptions, until next March. The committee is asked to "at least begin holding hearings before the adjournment of Congress so as to serve notice upon the Interstate Commerce Commission that

(Continued on page 1446)

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Akron, Canton & Youngstown	Apr.	171	$253,668	$104	$262,557	$44,209	$22,084	$13,631	$71,527	$18,477	$167,824	63.9	$94,733	$76,349	$50,851	$95,379
	4 mos.	171	971,599	387	1,007,554	149,002	103,859	58,071	284,080	73,244	661,704	65.7	345,850	272,294	181,739	351,814
Atchison, Topeka & Santa Fe	Apr.	9,630	11,455,552	2,235,502	15,174,326	3,860,780	3,439,836	410,290	4,786,636	450,690	12,904,119	85.0	2,270,207	1,241,893	1,221,996	3,342,104
	4 mos.	9,630	42,959,788	10,080,784	58,763,264	10,940,902	13,640,503	1,703,942	19,247,067	1,828,025	47,316,519	80.5	11,446,745	7,016,105	6,756,410	14,214,407
Gulf, Colorado & Santa Fe	Apr.	1,943	1,624,027	121,090	1,877,758	584,919	477,316	56,950	655,252	76,833	1,785,673	95.1	92,085	—4,615	—138,507	100,699
	4 mos.	1,943	6,722,206	550,424	7,766,198	2,342,259	1,950,337	227,897	2,699,195	308,571	7,445,246	95.9	320,952	—62,529	—638,441	858,157
Panhandle & Santa Fe	Apr.	1,569	1,037,920	75,198	1,197,768	488,442	296,983	19,562	380,452	38,034	1,209,129	100.9	—11,361	—63,294	—186,694	65,514
	4 mos.	1,569	4,239,789	325,316	4,886,976	1,594,719	1,176,370	79,346	1,552,139	160,948	4,506,195	92.2	380,781	171,241	—336,318	696,309
Atlanta & West Point	Apr.	93	148,145	40,132	219,735	30,555	35,490	12,743	84,149	12,536	180,554	82.1	39,181	25,487	11,825	41,689
	4 mos.	93	581,880	169,443	860,925	100,386	149,079	48,847	331,397	47,562	696,521	80.9	164,404	108,686	57,046	80,245
Western of Alabama	Apr.	133	185,105	43,027	251,448	30,784	46,720	13,169	81,856	14,105	191,136	76.0	60,312	43,985	45,142	57,218
	4 mos.	133	698,043	181,733	967,684	134,297	184,421	50,077	322,391	51,897	759,267	78.5	208,417	147,284	142,602	103,360
Atlanta, Birmingham & Coast	Apr.	639	286,677	15,518	343,055	92,386	78,696	28,200	147,219	18,748	376,213	109.6	—33,158	—48,158	—66,326	—23,130
	4 mos.	639	1,166,066	67,327	1,391,303	353,287	315,431	113,553	603,803	76,824	1,506,509	108.2	—115,206	—175,602	—245,676	—130,136
Atlantic Coast Line	Apr.	5,154	4,413,012	1,170,953	6,148,325	886,297	1,039,129	176,627	2,024,976	183,775	4,378,074	71.2	1,770,251	1,214,707	1,019,144	2,274,171
	4 mos.	5,154	17,915,472	5,951,492	26,336,943	3,508,030	4,361,093	720,895	8,400,284	721,929	18,085,432	68.7	8,251,511	5,967,849	5,319,583	8,423,971
Charleston & Western Carolina	Apr.	342	272,323	6,789	290,100	72,043	41,448	7,598	97,674	7,357	226,120	77.9	63,980	46,449	40,987	90,336
	4 mos.	342	935,034	30,951	1,003,372	253,953	156,167	29,482	373,798	29,160	842,531	84.0	160,841	86,800	69,082	213,579
Baltimore & Ohio	Apr.	5,658	15,234,918	1,646,874	18,080,223	2,072,589	4,055,241	535,888	6,247,103	705,813	13,798,352	76.3	4,281,871	3,409,936	3,132,732	3,519,290
	4 mos.	5,658	58,643,825	6,159,427	69,311,404	8,288,273	15,592,370	2,166,062	25,255,904	2,278,473	54,782,163	79.0	14,529,241	10,744,803	9,937,950	12,740,861
Baltimore & Ohio Chic. Term	Apr.	85	.....	.....	355,875	40.503	42,663	2,131	171,552	18,252	281,989	79.2	73,886	7,084	113,356	126,223
	4 mos.	85	.....	.....	1,286,303	152,813	185,828	9,751	716,581	78,038	1,169,643	90.9	116,660	—135,029	330,037	339,495
Staten Island Rapid Transit	Apr.	23	66,839	122,429	198,184	15.287	14,749	2,190	104,917	15,519	152,662	77.0	45,522	28,492	34,026	—9,035
	4 mos.	23	250,155	475,605	762,095	60,144	59,585	8,611	409,482	61,559	599,381	78.6	162,714	91,642	70,755	3,237
Bangor & Aroostook	Apr.	619	800,877	60,588	893,386	143,931	139,049	7,124	190,954	25,321	508,746	56.9	384,640	303,272	287,173	205,085
	4 mos.	619	3,331,573	288,126	3,742,780	486,819	545,253	24,054	844,112	107,435	2,017,787	53.9	1,724,993	1,420,240	1,347,113	1,077,086
Belt Ry. Co. of Chicago	Apr.	57	.....	.....	603,308	72,705	59,234	3,764	285,110	12,241	433,054	71.8	170,254	114,640	151,875	144,543
	4 mos.	57	.....	.....	2,380,411	233,559	264,654	15,944	1,155,021	47,348	1,716,526	72.1	663,885	441,680	601,997	606,648
Bessemer & Lake Erie	Apr.	227	944,101	4,705	965,241	163,917	324,957	15,143	250,845	36,131	792,087	82.1	173,154	140,188	140,002	255,766
	4 mos.	227	2,787,325	22,422	2,875,275	412,178	1,301,426	57,227	961,336	144,637	2,884,951	100.3	—9,676	—124,699	—33,374	536,589
Bingham & Garfield	Apr.	33	31,948	.....	32,734	7,234	9,104	1,743	8,088	5,878	32,164	98.3	570	—4,720	10,411	—9,156
	4 mos.	33	132,529	.....	136,023	20,073	34,459	6,643	34,542	20,192	116,413	85.6	19,610	—5,411	60,525	72,972
Boston & Maine	Apr.	2,090	3,940,831	1,070,237	5,810,589	976,303	981,568	100,852	2,101,711	215,878	4,398,460	75.7	1,412,129	1,140,769	927,155	1,049,920
	4 mos.	2,090	15,451,935	4,710,548	23,243,393	3,751,859	3,817,942	366,486	8,681,357	873,131	17,585,068	75.7	5,658,325	4,607,935	3,724,223	4,066,572
Brooklyn Eastern Dist. Term	Apr.	11	106,058	.....	108,317	11,350	12,957	1,224	35,407	5,730	66,668	61.5	41,649	34,628	34,628	39,187
	4 mos.	11	443,544	.....	452,706	35,802	61,521	2,056	145,414	22,657	267,450	59.1	185,256	157,142	157,142	166,247
Buffalo & Susquehanna	Apr.	253	146,043	780	160,714	27,893	46,008	1,951	43,819	7,669	127,340	79.2	33,374	31,299	42,699	18,886
	4 mos.	253	544,185	3,529	591,419	115,381	198,511	7,979	178,149	37,129	537,149	90.8	54,270	57,830	113,293	166,161
Buffalo, Rochester & Pittsburgh	Apr.	601	1,131,372	53,786	1,231,387	138,054	338,498	40,159	485,693	44,567	1,048,618	85.2	182,769	142,766	153,611	232,906
	4 mos.	601	4,761,649	234,848	5,161,815	533,695	1,484,713	152,160	2,031,146	181,184	4,390,794	85.1	771,021	610,955	679,425	967,212
Canadian Pacific Lines in Maine	Apr.	233	246,690	32,414	296,258	74,684	54,600	7,822	108,253	3,725	249,084	84.1	47,174	32,674	10,782	—43,700
	4 mos.	233	950,542	146,229	1,160,967	139,595	241,542	28,954	464,884	17,686	892,661	76.9	268,306	210,306	128,350	128,259
Canadian Pacific Lines in Vermont	Apr.	85	140,437	28,032	191,880	53,537	31,643	2,044	82,863	2,349	172,436	89.8	19,444	15,424	—15,053	—62,299
	4 mos.	85	438,461	116,318	638,066	94,774	145,617	7,549	367,333	9,919	625,192	97.9	12,874	—3,206	—124,494	—134,095
Central of Georgia	Apr.	1,944	1,483,224	248,966	1,956,738	241,931	348,155	69,782	768,290	85,230	1,526,699	78.0	430,039	305,010	314,502	427,530
	4 mos.	1,944	5,809,316	1,178,739	7,859,452	934,124	1,375,405	270,719	3,052,485	335,163	6,035,377	76.8	1,824,075	1,306,291	1,293,387	1,531,562
Central New Jersey	Apr.	692	3,450,745	638,616	4,375,531	464,639	1,007,160	68,814	1,697,932	130,131	3,394,424	77.6	981,107	555,685	419,383	695,594
	4 mos.	692	13,450,799	2,624,838	17,184,311	1,742,314	4,003,822	250,106	6,870,326	536,077	13,510,770	78.6	3,673,541	2,502,679	1,974,930	2,566,307
Central Vermont	Apr.	469	488,493	80,605	640,670	125,381	96,335	18,566	270,859	26,031	538,896	84.1	101,774	85,719	101,214	195,741
	4 mos.	469	1,906,621	329,655	2,477,948	363,747	430,058	70,987	1,113,225	107,083	2,092,874	84.5	385,074	321,036	398,432	603,578
Chesapeake & Ohio	Apr.	2,740	8,415,799	451,091	9,295,536	1,459,108	2,113,062	151,162	2,400,848	306,845	6,458,408	69.5	2,837,128	2,136,339	2,298,046	2,172,881
	4 mos.	2,739	35,730,486	1,731,055	39,007,688	5,954,550	8,664,461	594,057	10,099,459	1,165,321	26,568,708	68.1	12,438,980	9,637,406	10,190,112	10,769,204
Chicago & Alton	Apr.	1,028	1,443,563	362,352	2,021,499	257,110	481,452	74,228	777,209	65.117	1,668,848	82.6	352,651	238,627	12,210	184,163
	4 mos.	1,028	5,700,463	1,571,515	8,143,414	866,818	2,003,414	296,975	3,223,341	241,037	6,707,377	82.4	1,436,037	981,052	237,525	1,061,975
Chicago & Eastern Illinois	Apr.	946	1,314,135	208,814	1,681,820	224,915	332,321	79,883	717,195	69,606	1,438,945	85.6	242,875	112,586	—52,470	44,131
	4 mos.	946	5,462,043	937,721	7,009,220	918,473	1,576,083	330,795	2,981,005	284,930	6,126,297	87.4	882,923	390,256	—238,206	538,256
Chicago & Illinois Midland	Apr.	131	240,965	3,844	256,798	24,205	53,304	23,345	74,194	24,375	199,149	77.6	57,649	49,314	46,512	49,516
	4 mos.	131	951,469	24,898	1,017,632	116,825	226,223	83,672	318,662	79,689	824,484	81.0	193,148	159,808	135,902	198,023
Chicago & North Western	Apr.	8,458	7,932,575	1,491,194	10,586,279	1,966,083	2,244,559	222,654	4,127,785	392,371	8,956,908	84.6	1,629,371	851,352	729,099	1,496,297
	4 mos.	8,458	30,387,848	6,223,061	41,180,068	5,271,340	9,283,199	857,188	17,241,547	1,504,695	34,263,768	83.2	6,916,300	3,805,760	2,987,328	4,526,680

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Chicago, Burlington & Quincy	Apr.	9,325	$9,035,143	$1,090,154	$11,713,530	$2,041,703	$1,576,562	$303,555	$3,824,643	$377,179	$8,223,875	70.2	$3,489,655	$2,524,617	$2,312,717	$2,510,208
	4 mos.	9,348	35,816,075	4,826,001	45,730,394	5,025,195	6,695,035	1,247,215	16,180,446	1,509,603	31,061,035	67.9	14,669,359	10,781,201	9,836,855	12,909,961
Chicago Great Western	Apr.	1,495	1,599,702	161,609	1,910,411	305,162	276,477	86,019	762,050	56,123	1,491,414	78.1	418,997	335,440	174,358	69,150
	4 mos.	1,495	6,056,074	701,477	7,327,094	784,308	1,139,675	330,180	3,126,886	224,657	5,639,683	77.0	1,687,411	1,341,539	701,848	342,666
Chicago, Indianapolis & Louisville	Apr.	647	999,810	143,234	1,269,439	149,057	299,433	38,891	462,211	36,814	995,736	78.4	273,703	191,969	79,244	205,747
	4 mos.	647	4,130,557	530,323	5,147,300	541,279	1,147,372	156,236	1,969,801	149,318	4,006,726	77.8	1,140,574	822,350	332,501	638,797
Chic., Mil., St. Paul & Pacific	Apr.	11,353	9,827,214	976,390	11,973,713	2,192,125	2,561,923	315,601	4,458,607	374,417	9,945,143	83.1	2,028,570	1,223,859	881,472	1,669,749
	4 mos.	11,273	37,312,762	4,127,853	46,027,522	6,145,027	10,062,092	1,261,242	18,586,228	1,548,564	37,796,425	82.1	8,231,097	5,037,827	3,640,302	6,716,119
Chicago River & Indiana	Apr.	20	.....	.....	528,084	53,000	51,800	1,955	191,414	21,532	319,701	60.5	208,383	167,737	240,140	280,449
	4 mos.	20	.....	.....	2,128,938	212,000	207,200	4,278	775,932	73,138	1,272,548	59.8	856,390	692,515	983,175	1,159,350
Chicago, Rock Island & Pacific	Apr.	7,592	7,847,969	1,173,195	9,981,869	1,168,811	1,816,773	259,586	3,602,574	344,254	7,274,846	72.9	2,707,023	2,074,612	1,555,586	1,180,055
	4 mos.	7,592	30,180,465	5,283,906	39,278,379	4,796,879	7,833,299	1,008,980	15,386,716	1,400,542	30,837,261	78.5	8,441,118	6,176,944	4,438,743	5,207,024
Chicago, Rock Island & Gulf	Apr.	566	455,680	46,805	549,470	93,372	51,166	19,948	195,992	21,765	376,139	68.5	173,331	143,260	91,257	186,172
	4 mos.	566	1,745,847	250,931	2,173,882	331,754	241,990	87,132	793,611	88,763	1,547,479	71.2	626,403	544,000	391,634	757,347
Chic., St. Paul, Minn. & Omaha	Apr.	1,746	1,534,834	255,946	1,962,692	358,083	399,272	42,637	803,073	85,912	1,698,142	86.5	264,550	164,792	92,992	173,924
	4 mos.	1,746	6,429,029	1,053,769	8,103,331	1,007,859	1,586,470	166,975	3,598,067	339,394	6,743,117	83.2	1,360,214	929,878	631,134	495,529
Clinchfield Railroad	Apr.	309	540,069	9,431	559,300	75,611	137,373	21,634	116,948	18,602	370,137	66.2	189,163	119,158	161,465	204,958
	4 mos.	309	2,120,318	43,455	2,203,266	252,363	553,788	86,623	466,093	72,108	1,431,343	65.0	771,923	491,843	786,490	1,029,406
Colorado & Southern	Apr.	1,040	650,187	57,096	790,969	153,524	153,948	14,438	289,229	41,974	655,370	82.9	135,599	65,235	43,956	82,911
	4 mos.	1,039	2,924,397	253,294	3,494,622	496,428	674,241	66,181	1,257,036	174,258	2,671,913	76.5	822,709	542,281	449,451	552,988
Ft. Worth & Denver City	Apr.	696	586,268	97,294	743,917	136,676	144,118	19,240	240,027	39,314	579,571	77.9	164,346	131,838	119,147	154,442
	4 mos.	696	2,479,326	442,892	3,160,748	487,862	658,583	77,229	1,046,645	157,442	2,429,060	76.9	731,688	571,969	522,545	945,705
Wichita Valley	Apr.	271	67,729	2,094	74,951	23,071	5,615	10	28,843	1,588	58,989	78.7	15,962	8,871	—11,409	7,588
	4 mos.	271	268,310	13,334	301,439	89,243	24,047	80	120,855	6,091	236,791	78.6	64,648	36,152	—38,491	96,186
Columbus & Greenville	Apr.	167	123,015	11,642	143,241	36,123	18,838	5,020	50,561	11,659	121,647	84.9	21,594	16,975	12,937	9,998
	4 mos.	167	492,459	60,050	587,398	120,937	83,558	17,489	205,118	48,452	474,569	80.7	112,829	90,393	78,420	37,664
Conemaugh & Black Lick	Apr.	20	71,217	.....	139,566	15,473	25,302	788	85,641	3,692	130,896	93.8	8,670	7,670	9,980	11,323
	4 mos.	20	263,239	.....	535,666	44,863	102,281	3,558	331,913	15,155	497,770	92.9	37,896	33,896	42,105	37,689
Delaware & Hudson R. R. Corpn.	Apr.	881	2,522,726	185,331	2,911,308	394,712	756,116	48,823	1,110,741	159,531	2,473,983	85.0	437,325	314,003	295,683	666,120
	4 mos.	881	10,714,526	843,896	12,378,191	1,783,846	3,081,112	225,704	4,676,865	677,524	10,467,124	84.6	1,911,067	1,418,688	1,400,224	1,879,284
Delaware, Lackawanna & Western	Apr.	998	4,273,968	800,524	5,848,386	492,725	1,125,525	144,131	2,439,396	178,071	4,424,666	75.7	1,423,720	940,407	918,923	1,753,723
	4 mos.	998	16,852,431	3,275,775	22,964,492	2,133,144	4,662,662	569,027	9,903,484	719,390	18,148,211	79.0	4,816,281	2,950,861	2,942,704	5,088,823
Denver & Rio Grande Western	Apr.	2,561	1,713,107	176,638	2,071,705	302,363	472,223	56,177	638,331	91,975	1,578,150	76.2	493,555	328,464	349,874	519,196
	4 mos.	2,561	7,721,602	744,779	9,136,172	1,177,407	2,045,975	227,575	2,962,767	369,728	6,850,494	75.0	2,285,678	1,569,702	1,674,069	2,392,297
Denver & Salt Lake	Apr.	232	103,782	14,784	133,111	52,884	59,176	2,884	33,340	13,390	157,564	118.4	—24,453	—38,502	—32,276	46,038
	4 mos.	232	845,839	64,063	970,967	159,073	254,708	10,025	172,573	50,458	642,727	66.2	328,240	272,183	298,611	535,018
Detroit & Mackinac	Apr.	241	81,583	6,746	95,967	17,777	17,883	2,284	35,832	8,263	78,739	82.0	17,228	7,661	7,543	27,405
	4 mos.	265	262,247	32,705	324,956	62,208	76,681	9,411	141,613	29,904	316,478	97.4	8,478	—29,610	—29,713	30,018
Detroit & Toledo Shore Line	Apr.	50	334,083	.....	339,098	47,194	35,987	7,632	95,231	8,846	194,806	57.4	144,292	124,798	60,652	55,495
	4 mos.	50	1,542,524	.....	1,562,046	119,940	141,188	30,696	391,737	34,434	717,910	46.0	844,136	711,207	407,652	531,047
Detroit Terminal	Apr.	19	.....	.....	145,878	16,905	12,853	49	67,808	4,619	102,234	70.1	43,644	23,953	24,603	67,376
	4 mos.	19	.....	.....	555,793	53,745	56,081	49	277,687	20,092	407,654	73.3	148,139	83,016	84,662	289,031
Detroit, Toledo & Ironton	Apr.	501	1,225,685	1,551	1,248,546	163,158	135,102	15,638	266,955	33,880	613,357	49.1	635,189	568,825	510,075	406,900
	4 mos.	505	4,445,689	6,803	4,508,310	535,115	435,894	55,160	1,097,335	137,678	2,259,792	50.1	2,248,518	1,980,385	1,797,808	1,881,101
Duluth, Missabe & Northern	Apr.	567	140,431	3,520	170,041	247,227	326,100	4,380	203,734	36,722	818,148	481.2	—648,107	—741,042	—732,045	240,183
	4 mos.	567	614,806	25,640	737,709	729,299	1,247,889	17,254	835,320	176,363	3,006,103	407.5	—2,268,394	—2,697,832	—2,671,151	—1,617,246
Duluth, Winnipeg & Pacific	Apr.	178	117,897	7,092	133,084	36,541	28,181	4,984	60,572	7,494	140,258	105.3	—7,174	—13,828	—10,723	—7,613
	4 mos.	178	630,901	37,280	696,897	109,155	158,203	20,591	294,670	30,743	625,194	89.7	71,703	35,825	31,344	144,110
Elgin, Joliet & Eastern	Apr.	452	1,970,311	9	2,161,916	230,004	412,387	16,391	758,287	54,745	1,471,152	68.0	690,764	565,577	377,270	604,578
	4 mos.	453	7,473,362	35	8,202,884	821,198	1,601,743	62,408	3,063,325	216,040	5,763,196	70.3	2,439,688	1,947,574	1,196,591	1,828,260
Erie Railroad	Apr.	2,046	6,522,589	763,623	7,970,705	1,041,140	1,898,755	171,519	3,118,315	310,648	6,585,325	82.6	1,385,380	986,862	910,304	1,501,504
	4 mos.	2,046	25,941,274	3,018,159	31,691,307	3,504,818	7,730,820	730,000	12,909,449	1,232,058	26,233,994	82.8	5,457,313	3,860,720	3,572,519	5,791,461
Chicago & Erie	Apr.	269	985,568	44,472	1,118,830	136,564	139,456	29,286	348,433	44,898	698,467	62.4	420,363	362,198	87,250	328,037
	4 mos.	269	4,097,374	193,565	4,627,765	471,858	516,347	122,217	1,454,300	181,266	2,744,964	59.3	1,882,801	1,650,053	549,294	1,025,863
New Jersey & New York	Apr.	45	24,186	91,792	120,775	14,229	20,910	1,396	65,565	3,706	105,805	87.6	14,970	10,637	—18,903	—22,522
	4 mos.	45	89,993	361,464	470,123	51,968	93,831	6,971	261,858	14,734	429,324	91.3	40,799	23,420	—101,474	—103,638
N. Y., Susquehanna & Western	Apr.	131	308,197	39,017	390,616	46,571	51,321	4,861	171,534	12,537	286,817	73.4	103,799	72,249	41,439	67,446
	4 mos.	131	1,206,682	154,551	1,516,716	177,346	192,979	20,377	706,695	50,421	1,147,667	75.7	369,049	242,824	132,967	213,621
Florida East Coast	Apr.	863	792,040	343,742	1,320,215	160,635	195,695	29,046	385,415	31,902	820,663	62.2	499,552	379,310	294,630	423,267
	4 mos.	863	2,897,142	2,374,490	6,048,153	644,861	810,171	137,817	1,563,846	175,043	3,447,373	57.0	2,600,780	2,079,734	1,772,906	2,348,741

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Fort Smith & Western	Apr.	249	$79,628	$5,647	$91,911	$20,786	$22,178	$6,094	$36,844	$6,833	$91,658	99.7	$253	—$3,976	—$15,345	—$7,680
	4 mos.	249	406,745	29,631	464,574	87,229	96,955	23,314	167,330	27,003	399,152	85.9	65,422	47,010	3,378	18,825
Galveston Wharf	Apr.	13	.....	.....	134,529	37,289	7,748	4,480	28,285	6,689	97,350	72.4	37,179	12,179	12,985	30,055
	4 mos.	13	.....	.....	514,408	151,576	24,556	16,032	109,850	24,780	379,336	73.7	135,072	35,072	36,535	227,318
Georgia Railroad	Apr.	328	358,534	43,951	434,855	49,188	81,685	23,778	179,261	23,763	357,467	82.2	77,388	69,249	78,969	112,525
	4 mos.	328	1,313,126	171,398	1,607,339	177,236	323,304	91,096	705,542	91,077	1,387,502	86.3	219,837	183,933	236,369	312,443
Georgia & Florida	Apr.	501	110,768	5,647	124,664	32,952	20,190	8,972	50,433	7,699	120,471	96.6	4,193	—4,507	—3,566	4,512
	4 mos.	501	446,664	27,984	506,528	111,536	86,672	38,707	208,857	31,789	478,460	94.5	28,068	—9,783	—12,027	19,349
Grand Trunk Western	Apr.	1,019	2,375,167	142,041	2,673,888	296,844	457,617	70,319	1,027,145	109,855	1,973,826	73.8	700,062	539,786	397,598	618,821
	4 mos.	1,019	8,679,200	606,170	9,950,066	1,017,127	1,866,166	290,131	4,036,002	420,983	7,692,185	77.3	2,257,881	1,707,394	1,097,779	2,718,058
Atlantic & St. Lawrence	Apr.	166	120,652	20,869	159,517	27,470	57,246	5,846	99,429	9,819	201,543	126.3	—42,026	—56,318	—111,611	—133,790
	4 mos.	166	594,166	90,606	751,329	107,323	185,055	24,320	392,116	35,056	750,052	99.8	1,277	—56,475	—284,013	—353,215
Great Northern	Apr.	8,366	6,024,274	663,876	7,425,102	1,717,221	1,617,757	273,882	2,575,182	248,704	6,515,871	87.8	909,231	176,549	136,060	1,578,298
	4 mos.	8,366	21,929,692	3,059,893	27,847,938	4,423,346	6,419,969	1,014,634	11,028,372	972,249	24,128,943	86.6	3,718,995	997,818	674,385	5,132,466
Green Bay & Western	Apr.	234	140,354	2,783	148,052	21,491	24,343	6,970	58,209	2,918	113,849	76.8	34,203	24,203	18,942	17,155
	4 mos.	234	543,416	12,285	573,991	79,781	89,635	23,281	220,926	11,644	424,984	74.0	149,007	115,007	97,072	55,738
Gulf & Ship Island	Apr.	307	188,809	26,872	253,484	53,178	47,220	4,903	93,228	7,069	209,151	82.5	44,333	12,084	—3,712	9,934
	4 mos.	307	819,311	131,647	1,085,693	195,205	192,310	19,463	408,184	28,744	857,936	79.0	227,757	99,093	44,907	29,894
Gulf, Mobile & Northern	Apr.	733	497,127	21,030	539,881	90,394	89,125	28,664	168,303	26,008	402,933	74.63	136,948	108,486	73,066	114,018
	4 mos.	733	1,910,818	100,182	2,093,792	351,753	381,689	131,320	685,570	116,830	1,668,517	79.69	425,275	304,013	178,701	384,840
Hocking Valley	Apr.	348	1,370,190	35,197	1,529,335	192,380	315,137	19,133	405,889	47,656	981,086	64.2	548,249	423,270	252,499	310,630
	4 mos.	348	5,068,643	160,161	5,575,984	721,950	1,302,982	78,070	1,598,364	190,810	3,892,948	69.8	1,683,036	1,183,189	1,000,881	1,555,594
Illinois Central	Apr.	5,018	8,314,837	1,349,130	10,885,249	1,373,952	2,635,632	248,176	4,096,517	382,792	8,825,630	81.1	2,059,619	1,331,874	1,265,279	2,022,471
	4 mos.	5,018	34,612,803	6,459,422	44,802,621	5,386,786	10,449,197	1,092,880	16,980,307	1,472,959	35,743,815	79.8	9,058,806	5,963,817	5,790,307	8,979,531
Yazoo & Mississippi Valley	Apr.	1,705	1,779,971	209,890	2,126,495	327,048	378,429	48,094	802,595	67,160	1,628,415	76.6	498,080	330,765	228,770	266,445
	4 mos.	1,705	7,013,309	982,714	8,518,438	1,244,433	1,467,669	180,936	3,267,380	264,773	6,431,295	75.5	2,087,143	1,415,780	1,052,649	599,022
Illinois Central System	Apr.	6,724	10,107,528	1,562,747	13,028,19[illegible]	1,701,000	3,017,131	296,270	4,907,010	450,068	10,465,129	80.3	2,563,062	1,667,169	1,498,579	2,288,964
	4 mos.	6,724	41,676,191	7,458,397	53,387,402	6,631,219	11,931,594	1,273,816	20,282,365	1,738,178	42,224,962	79.1	11,162,440	7,392,411	6,855,770	9,582,546
Illinois Terminal	Apr.	477	459,158	101,242	590,334	56,451	77,450	16,541	205,015	45,512	399,704	67.71	190,630	166,553	131,438	110,337
	4 mos.	477	1,723,458	445,151	2,271,906	236,536	303,562	70,430	847,190	148,747	1,601,240	70.48	670,666	574,589	409,296	428,056
Kansas City Southern	Apr.	784	1,171,594	64,508	1,387,182	182,713	255,188	69,542	428,333	82,156	1,023,730	73.8	363,452	249,505	200,910	292,949
	4 mos.	784	4,739,978	283,366	5,574,855	605,778	981,670	250,231	1,742,675	324,390	3,919,240	70.3	1,655,615	1,200,377	979,081	1,087,794
Texarkana & Ft. Smith	Apr.	99	196,806	5,043	230,329	26,979	35,258	9,957	55,960	18,807	148,949	64.7	81,380	65,695	52,209	103,935
	4 mos.	99	719,948	22,365	822,536	114,835	102,447	34,293	223,937	49,275	533,060	64.8	289,476	226,702	124,503	342,227
Kansas, Oklahoma & Gulf	Apr.	326	249,816	1,590	256,583	33,602	24,218	16,982	64,510	11,604	150,854	58.8	105,729	84,999	64,013	90,122
	4 mos.	326	1,030,710	8,772	1,059,091	96,829	92,957	64,105	262,655	43,218	559,320	52.8	499,771	416,335	328,149	370,890
Lake Superior & Ishpeming	Apr.	160	72,145	844	80,294	25,340	32,227	574	33,701	6,480	98,322	122.5	—18,028	—30,895	—32,565	107,760
	4 mos.	160	242,583	5,139	267,939	91,850	115,227	2,265	134,055	25,159	368,556	137.6	—100,617	—152,269	—167,097	—2,897
Lake Terminal	Apr.	12	.....	.....	71,680	21,427	10,611	.....	45,974	1,984	79,996	111.6	—8,316	—14,741	—19,557	—5,619
	4 mos.	12	.....	.....	235,276	53,332	47,033	.....	147,845	9,141	257,351	109.4	—22,075	—47,775	—63,517	—23,975
Lehigh & Hudson River	Apr.	96	179,827	1,125	190,769	22,611	31,737	3,701	68,957	10,021	137,027	71.8	53,742	40,803	24,809	40,332
	4 mos.	96	696,824	4,242	743,661	111,839	128,508	14,364	281,486	38,421	574,618	77.3	169,043	122,749	62,045	116,461
Lehigh & New England	Apr.	216	427,109	820	431,694	57,557	85,514	5,264	143,011	18,441	309,787	71.8	121,907	106,089	98,904	96,572
	4 mos.	216	1,504,994	3,471	1,527,992	189,297	336,664	25,036	582,220	71,527	1,204,744	78.8	323,248	276,594	273,287	234,989
Lehigh Valley	Apr.	1,361	3,963,238	481,511	4,887,573	485,306	1,244,432	147,888	2,112,551	140,713	4,159,236	85.1	728,337	462,829	377,420	1,150,004
	4 mos.	1,361	16,420,497	1,856,839	19,908,588	1,523,158	4,835,161	571,618	8,856,754	595,049	16,495,969	82.9	3,412,619	2,314,830	1,924,637	3,398,610
Louisiana & Arkansas	Apr.	635	599,380	18,672	642,844	112,596	124,033	21,574	185,373	25,389	466,748	72.6	176,096	131,083	84,396	131,996
	4 mos.	635	2,321,966	81,054	2,499,905	371,208	454,459	83,378	749,986	96,196	1,752,812	70.1	747,093	565,920	381,324	399,177
Louisiana, Arkansas & Texas	Apr.	202	80,993	1,706	86,409	22,765	15,233	2,615	35,601	6,378	82,592	95.6	3,817	—218	—12,282	—16,719
(formerly La. Ry & N. Co. of Tex.)	4 mos.	204	314,867	8,614	335,836	88,965	68,018	11,307	159,978	21,648	350,342	104.3	—14,506	—30,587	—85,580	—91,330
Louisville & Nashville	Apr.	5,244	7,968,196	979,979	9,586,518	1,676,652	2,481,380	241,645	3,504,926	363,994	8,304,404	86.6	1,282,114	828,150	817,095	1,189,056
	4 mos.	5,249	32,631,319	4,489,590	39,606,818	6,405,365	10,171,741	1,036,758	14,519,485	1,475,554	33,817,290	85.4	5,789,528	3,763,585	3,890,361	5,754,450
Maine Central	Apr.	1,121	1,279,593	190,502	1,614,339	247,434	304,702	14,086	588,130	50,286	1,205,209	74.7	409,130	311,613	239,455	215,210
	4 mos.	1,121	5,304,268	860,595	6,663,617	887,511	1,226,559	62,005	2,541,129	204,160	4,924,792	73.9	1,738,825	1,353,402	1,099,368	864,911
Midland Valley	Apr.	363	257,768	4,963	270,959	39,943	35,640	5,424	64,707	13,039	158,481	58.5	112,478	97,872	82,143	85,287
	4 mos.	363	926,940	27,247	985,554	112,298	139,696	22,106	269,163	48,771	588,783	59.7	396,771	338,751	275,515	330,961
Minneapolis & St. Louis	Apr.	1,627	900,020	53,745	1,021,477	126,889	184,562	36,294	454,750	43,826	846,812	82.9	174,665	113,965	83,668	—66,083
	4 mos.	1,627	3,460,433	215,764	3,925,607	455,858	867,602	151,448	1,963,231	177,634	3,615,351	92.1	310,256	65,068	—105,692	64,305
Minn., St. Paul & S. S. Marie	Apr.	4,411	2,677,187	235,850	3,164,686	545,682	719,854	77,007	1,271,995	133,225	2,722,867	86.0	441,819	273,762	79,432	722,964
	4 mos.	4,411	9,818,198	1,046,393	11,817,755	1,838,904	2,781,869	316,729	5,108,239	515,259	10,615,336	89.8	1,202,419	308,725	—228,018	1,092,782

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Duluth, South Shore & Atlantic	Apr.	573	$277,214	$32,122	$333,130	$43,317	$64,420	$8,670	$134,169	$10,712	$263,211	79.0	$69,919	$38,910	$25,335	$31,454
	4 mos.	573	1,125,016	150,332	1,354,367	173,563	265,973	33,488	598,662	42,609	1,122,997	82.9	231,370	107,024	52,372	107,276
Spokane International	Apr.	165	65,159	5,550	77,123	15,258	7,913	3,349	26,284	5,838	59,552	76.6	17,571	12,488	6,847	6,662
	4 mos.	165	247,967	26,797	297,615	67,968	30,706	14,336	116,132	24,920	257,836	86.6	39,779	19,371	—818	45,453
Mississippi Central	Apr.	150	118,754	4,824	127,495	18,545	23,411	10,090	34,712	8,431	95,189	74.7	32,306	23,632	25,063	34,993
	4 mos.	150	462,358	20,907	499,545	70,279	101,126	40,546	139,872	34,223	386,046	77.3	113,499	82,455	84,682	120,478
Missouri & North Arkansas	Apr.	364	154,418	5,172	167,126	29,997	16,273	9,647	55,230	8,199	119,366	71.4	47,760	45,316	28,731	14,197
	4 mos.	364	544,783	26,409	603,101	114,129	60,093	38,934	228,256	33,436	475,742	78.9	127,359	117,584	59,813	—1,310
Missouri & Illinois	Apr.	202	156.057	1,361	160,553	36,342	27,188	3,655	44,389	7,456	118,661	73.9	41,892	41,692	31,726	27,381
	4 mos.	202	587,307	7,875	608,817	92,267	130,720	14,472	183,860	26,946	447,244	73.5	161,573	136,973	107,214	116,746
Missouri-Kansas-Texas Lines	Apr.	3,188	2,891,073	400,204	3,617,166	502,528	656,747	126,204	1,171,331	172,689	2,625,839	72.6	991,327	761,814	554,526	692,421
	4 mos.	3,188	11,383,200	1,801,041	14,451,697	1,928,161	2,695,331	488,950	4,913,804	700,025	10,773,126	74.5	3,678,571	2,794,936	1,928,340	3,299,352
Missouri Pacific	Apr.	7,452	8,434,249	830,502	10,144,941	1,829,180	1,821,411	308,872	3,565,506	402,694	7,894,860	77.8	2,250,081	1,886,607	1,474,565	1,392,512
	4 mos.	7,452	33,440,466	3,807,817	40,694,684	5,870,223	7,149,954	1,236,326	14,971,440	1,584,882	30,819,721	75.7	9,874,963	8,098,893	6,434,521	6,585,804
Gulf Coast Lines	Apr.	1,026	1,419,911	121,506	1,649,877	257,954	256,054	38,388	440,089	65,475	1,055,796	63.99	594,081	545,457	379,330	264,416
	4 mos.	1,026	5,343,186	562,198	6,246,916	936,880	944,978	191,185	1,662,982	254,786	3,962,765	63.43	2,284,151	2,090,131	1,569,405	1,080,787
International-Great Northern	Apr.	1,159	1,027,639	125,252	1,289,405	219,935	242,445	40,120	551,429	73,660	1,133,216	87.89	156,189	112,654	1,422	168,475
	4 mos.	1,159	3,960,697	606,639	5,118,925	858,088	987,737	183,832	2,189,306	286,175	4,532,524	88.54	586,401	412,558	18,996	501,819
San Antonio, Uvalde & Gulf	Apr.	318	132,895	15,232	163,534	36,655	19,252	5,643	43,856	7,830	112,012	68.5	51,522	46,437	18,806	46,983
	4 mos.	318	515,558	63,692	635,257	161,405	64,678	24,916	152,652	31,393	430,869	67.8	204,388	185,137	77,003	115,134
Mobile & Ohio	Apr.	1,159	1,237,156	59,303	1,362,993	193,214	230,579	53,363	488,258	49,982	1,013,613	74.4	349,380	260,739	189,816	297,888
	4 mos.	1,159	4,491,471	276,528	5,045,301	716,761	932,132	228,171	1,944,231	204,592	4,013,826	79.6	1,031,475	684,349	446,039	734,986
Monongahela	Apr.	177	529,073	6,179	539,998	80,000	70,000	1,355	142,711	10,802	304,653	56.4	235,345	217,362	115,511	115,572
	4 mos.	178	2,089,707	29,432	2,136,594	320,000	280,000	5,126	586,297	43,722	1,233,384	57.7	903,210	837,075	427,390	644,899
Monongahela Connecting	Apr.	6	.....	.....	185,186	21,202	32,340	300	77,126	2,744	133,712	72.2	51,474	40,985	30,826	56,028
	4 mos.	6	.....	.....	720,769	81,153	132,206	1,227	322,894	11,290	548,770	76.1	171,999	136,437	101,249	183,601
Montour	Apr.	57	190,216	.....	190,725	21,228	48,354	1,166	50,029	7,850	128,627	67.4	62,098	60,323	70,801	64,185
	4 mos.	57	732,517	150	734,147	72,861	206,732	5,431	209,981	30,154	525,159	71.5	208,988	201,888	250,927	221,242
Nashville, Chatt. & St. Louis	Apr.	1,203	1,543,562	182,452	1,873,481	300,253	365,918	74,016	677,803	80,124	1,499,104	80.0	374,377	292,320	281,193	681,927
	4 mos.	1,203	5,508,102	853,331	6,971,531	1,000,041	1,454,799	347,662	2,638,952	323,940	5,797,008	83.2	1,174,523	898,482	891,818	1,721,083
Nevada Northern	Apr.	165	57,066	2,882	67,040	13,365	6,407	1,051	15,109	4,107	40,065	59.8	26,975	18,920	19,218	59,092
	4 mos.	165	241,770	14,365	285,861	49,113	25,922	4,161	61,986	17,045	158,503	55.4	127,358	92,672	92,511	227,154
Newburgh & South Shore	Apr.	6	.....	.....	135,374	Cr.30,824	Cr.116,179	.....	57,290	6,564	Cr.83,149	61.4	218,523	202,503	209,473	49,553
	4 mos.	6	.....	.....	464,387	6,579	Cr. 24,880	.....	227,583	25,315	234,597	50.5	229,790	165,707	181,457	91,763
New Orleans Great Northern	Apr.	264	249,906	12,863	270,209	32,713	34,184	14,605	77,905	11,214	170,621	63.1	99,588	83,277	43,435	35,471
	4 mos.	264	950,948	52,860	1,034,329	116,412	182,269	41,117	324,908	41,977	704,287	68.1	330,042	268,592	129,951	147,410
New Orleans Terminal	Apr.	20	795	.....	130,722	25,597	17,720	.....	56,545	1,823	101,685	77.8	29,037	17,780	22,696	67,977
	4 mos.	20	6,574	.....	537,812	75,960	48,159	.....	221,254	6,894	352,267	65.5	185,545	140,515	125,945	195,009
New York Central Lines	Apr.	11,477	27,199,423	8,954,791	41,338,510	5,508,463	9,193,707	790,744	14,643,250	1,388,449	32,183,331	77.9	9,155,179	6,253,787	5,499,314	8,724,353
	4 mos.	11,477	107,609,677	37,043,021	164,533,475	19,605,169	37,538,653	3,245,826	61,343,927	5,646,000	130,158,456	79.1	34,375,019	22,753,696	19,945,424	31,370,549
Indiana Harbor Belt	Apr.	120	.....	.....	976,479	90,000	114,000	5,073	380,314	33,708	637,849	65.3	338,630	291,719	239,013	254,600
	4 mos.	120	.....	.....	3,764,780	360,000	456,000	20,190	1,687,873	119,590	2,713,036	72.1	1,051,744	854,039	745,428	899,967
Pittsburgh & Lake Erie	Apr.	231	2,206,542	153,487	2,437,425	252,851	746,368	49,952	819,774	75,709	1,955,939	80.2	481,486	317,967	602,942	716,069
	4 mos.	231	8,361,092	648,270	9,321,695	1,014,232	2,880,090	156,227	3,271,019	312,098	7,677,874	82.4	1,643,821	1,018,599	2,132,989	2,383,210
New York, Chicago & St. Louis	Apr.	1,690	3,972,502	160,828	4,289,041	606,283	826,805	137,499	1,517,000	146,981	3,171,556	73.9	1,117,485	898,554	658,819	1,004,306
	4 mos.	1,690	15,245,579	601,430	16,434,923	1,999,008	3,225,691	543,437	6,227,640	567,465	12,499,436	76.0	3,935,487	3,157,279	2,232,870	3,665,075
New York, New Haven & Hartford	Apr.	2,132	5,532,265	3,548,162	10,298,632	1,522,435	1,517,800	108,030	3,345,269	311,391	6,996,748	67.9	3,301,884	2,616,029	2,070,406	2,586,855
	4 mos.	2,133	21,175,117	14,254,764	40,108,752	5,066,652	6,434,270	407,069	13,464,620	1,297,098	27,454,486	68.5	12,654,266	9,904,076	7,705,730	8,830,991
New York Connecting	Apr.	20	180,883	.....	208,747	25,769	11,154	.....	30,647	1,267	68,837	33.0	139,910	101,910	76,864	100,927
	4 mos.	20	779,688	.....	881,525	64,793	41,979	.....	134,380	8,101	249,253	28.3	632,272	480,272	368,999	289,645
New York, Ontario & Western	Apr.	568	580,725	56,489	778,072	119,069	186,111	18,266	362,081	30,280	718,340	92.3	59,732	16,988	—27,620	38,866
	4 mos.	568	2,500,653	182,678	3,243,993	404,608	718,053	70,763	1,572,929	133,541	2,922,586	90.1	321,407	151,036	—12,086	—44,310
Norfolk & Western	Apr.	2,240	7,526,164	319,772	8,167,623	1,131,408	1,613,795	132,352	2,014,929	259,691	5,163,361	63.2	3,004,262	2,103,971	2,258,850	2,832,456
	4 mos.	2,240	31,690,789	1,380,695	34,335,468	4,438,802	6,852,006	503,995	8,432,320	1,017,687	21,327,858	62.1	13,007,610	9,405,851	10,207,739	11,446,530
Norfolk Southern	Apr.	932	583,294	21,991	639,289	81,059	98,993	28,529	239,935	27,199	475,541	74.4	163,748	111,838	88,807	171,788
	4 mos.	932	2,112,078	87,829	2,340,287	320,570	372,944	114,911	941,100	112,055	1,858,933	79.4	481,354	271,225	208,216	416,765
Northern Pacific	Apr.	6,783	5,236,265	535,663	6,394,268	1,436,638	1,437,584	252,262	2,317,801	264,986	5,811,677	90.9	582,591	—99,304	215,296	1,285,433
	4 mos.	6,783	19,561,506	2,316,834	24,332,255	3,514,996	5,988,035	877,786	9,774,216	1,044,186	21,598,099	88.8	2,734,156	41,089	1,342,152	4,651,112
Northwestern Pacific	Apr.	439	266,292	126,221	434,145	135,570	86,201	8,824	200,146	16,321	446,367	102.8	—12,222	—48,076	—55,856	—68,419
	4 mos.	467	965,017	461,892	1,580,812	445,991	384,144	30,791	802,571	67,109	1,728,614	109.3	—147,802	—292,947	—310,242	—282,470

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Oklahoma City-Ada-Atoka Ry.	Apr.	129	$75,660	$4,571	$86,351	$26,362	$9,297	$1,342	$23,694	$4,274	$64,897	75.2	$21,454	$17,261	$4,134	$25,848
	4 mos.	129	298,632	23,641	338,366	103,809	39,129	5,535	118,086	15,735	279,139	82.5	59,228	42,008	—13,544	—26,628
Pennsylvania R. R.	Apr.	10,511	34,632,792	9,981,188	49,645,598	5,727,010	9,576,239	883,575	17,616,376	1,663,977	36,068,021	72.7	13,577,577	10,548,260	9,385,703	12,103,360
	4 mos.	10,511	133,308,242	39,598,290	191,707,193	23,016,849	39,545,654	3,650,166	72,387,711	6,855,057	147,969,468	77.2	43,737,725	33,316,280	28,792,424	39,624,842
Long Island	Apr.	404	861,451	2,087,831	3,123,136	445,469	463,921	21,725	1,247,195	68,061	2,247,085	71.9	876,051	673,273	523,097	621,641
	4 mos.	404	3,306,440	7,836,391	11,778,043	1,652,541	1,859,146	101,764	5,210,868	278,724	9,104,775	77.3	2,673,268	2,141,594	1,570,685	1,929,832
West Jersey & Seashore	Apr.	369	386,054	275,364	691,871	98,942	80,435	4,509	326,854	16,207	529,283	76.5	162,588	87,728	62,064	76,191
	4 mos.	369	1,482,040	992,044	2,600,937	360,998	356,463	16,874	1,283,656	63,733	2,092,409	80.4	508,528	379,943	280,365	402,554
Peoria & Pekin Union	Apr.	19	13,904	714	139,314	33,738	16,608	4,873	61,477	7,866	124,562	89.4	14,752	—2,248	19,185	28,245
	4 mos.	19	60,648	4,268	576,612	80,112	61,500	20,464	263,505	33,703	459,284	79.7	117,328	48,999	120,280	157,827
Pere Marquette	Apr.	2,241	3,006,745	157,786	3,358,075	463,091	695,864	75,179	1,214,797	116,624	2,569,786	76.5	788,289	601,988	401,514	890,886
	4 mos.	2,241	11,517,492	714,672	12,945,677	1,805,572	2,895,696	302,112	4,895,741	469,665	10,394,415	80.3	2,551,262	2,017,115	1,365,283	3,372,504
Pittsburgh & Shawmut	Apr.	102	102,400	4,552	108,988	14,419	25,050	1,506	32,326	7,346	80,647	74.0	28,341	27,025	30,213	16,843
	4 mos.	102	412,503	19,646	437,374	57,185	104,111	6,715	132,639	28,572	329,222	75.3	108,152	102,939	114,138	160,952
Pittsburgh & West Virginia	Apr.	92	330,024	3,335	361,717	26,185	78,235	21,163	64,519	20,027	220,553	61.0	141,164	114,197	169,391	223,063
	4 mos.	92	1,139,252	12,769	1,268,002	96,383	303,310	80,137	251,029	76,080	846,508	66.8	421,494	314,462	486,236	876,433
Pittsburgh, Shawmut & Northern	Apr.	198	139,754	1,059	143,965	30,895	27,909	1,891	47,596	7,197	115,488	80.2	28,477	25,437	18,392	28,498
	4 mos.	198	548,011	4,733	566,738	90,027	108,563	7,298	190,932	26,733	423,553	74.7	143,185	131,629	104,543	125,579
Quincy, Omaha & Kansas City	Apr.	249	43,337	5,388	54,594	27,266	7,437	838	24,105	2,562	61,896	113.4	—7,302	—12,005	—14,651	—20,635
	4 mos.	249	156,367	25,795	205,662	73,477	23,331	3,380	99,721	10,850	209,970	102.1	—4,308	—23,088	—32,460	—46,536
Reading	Apr.	1,462	6,215,482	517,530	7,194,156	1,156,390	1,830,750	96,522	2,820,938	233,129	6,161,798	85.6	1,032,358	787,209	747,711	1,608,153
	4 mos.	1,461	25,705,436	2,192,405	29,650,226	4,427,361	7,515,066	382,640	11,623,041	904,307	24,951,642	84.2	4,698,584	3,594,511	3,579,550	5,611,713
Atlantic City	Apr.	163	122,572	80,757	220,683	69,727	22,307	3,421	154,021	3,893	253,521	114.9	—32,838	—72,842	—90,279	—95,788
	4 mos.	163	467,831	275,586	810,610	297,087	84,212	13,175	627,121	20,310	1,042,470	128.6	—231,860	—391,864	—454,116	—469,599
Richmond, Fredericksburg & Potomac	Apr.	117	478,097	322,959	1,009,498	181,864	181,347	9,693	336,122	38,995	786,287	77.9	223,211	177,101	113,896	297,649
	4 mos.	117	1,852,873	1,504,763	4,162,397	504,644	727,605	41,555	1,416,198	151,586	2,974,801	71.5	1,187,596	975,203	695,071	1,132,480
Rutland	Apr.	413	292,795	62,357	442,729	54,117	90,531	10,797	184,402	16,750	358,360	80.9	84,369	58,984	67,554	100,114
	4 mos.	413	1,052,380	320,814	1,739,233	291,386	389,958	45,964	737,436	68,322	1,538,902	88.5	200,331	118,839	153,734	233,591
St. Louis-San Francisco	Apr.	5,314	4,957,679	647,245	6,078,078	794,237	1,147,654	130,731	2,121,150	237,108	4,408,343	72.5	1,669,735	1,324,967	1,333,338	1,453,672
	4 mos.	5,314	19,365,336	2,973,679	24,332,631	2,950,125	4,702,382	513,021	8,769,738	939,260	17,778,857	73.1	6,553,774	5,268,694	5,303,435	5,831,931
Ft. Worth & Rio Grande	Apr.	233	58,938	3,540	72,288	24,139	16,653	2,991	41,010	4,666	89,107	123.3	—16,819	—21,285	—31,114	—27,241
	4 mos.	233	224,041	18,244	279,486	82,315	62,271	12,231	161,210	18,262	335,214	119.9	—55,728	—73,884	—107,709	—46,345
St. Louis, San Francisco & Texas	Apr.	154	113,229	9,191	128,579	20,664	21,687	6,005	53,649	8,616	110,541	86.0	18,038	14,900	—12,851	15,052
	4 mos.	154	449,720	39,486	511,019	76,947	85,337	23,160	214,843	32,540	432,928	84.7	78,091	65,552	—44,300	8,656
St. Louis Southwestern Lines	Apr.	1,816	1,869,347	70,511	2,107,878	303,469	352,667	105,123	678,586	99,803	1,552,076	73.6	555,802	458,677	286,508	213,530
	4 mos.	1,816	7,018,313	317,336	7,922,601	1,193,711	1,363,206	434,660	2,745,668	394,959	6,199,533	78.3	1,723,068	1,366,547	850,474	905,549
San Diego & Arizona	Apr.	155	88,305	9,876	102,480	17,153	17,131	3,835	26,127	7,772	73,405	71.6	29,075	23,703	23,882	29,149
	4 mos.	155	316,498	88,966	414,465	66,119	67,650	16,476	110,904	32,992	299,611	72.3	114,854	93,363	95,581	120,858
Seaboard Air Line	Apr.	4,499	3,741,502	416,371	4,584,271	638,744	806,336	206,610	1,681,864	184,734	3,578,480	78.1	1,005,791	653,790	550,432	1,083,987
	4 mos.	4,502	14,629,161	2,820,212	19,362,062	2,591,695	3,238,908	842,494	6,935,199	724,585	14,582,647	75.3	4,779,415	3,397,684	2,911,665	4,095,140
Southern Ry.	Apr.	6,731	8,737,731	1,437,786	11,089,611	1,688,954	2,052,105	240,252	3,669,964	369,232	8,100,653	73.0	2,988,958	2,198,804	2,020,726	3,108,642
	4 mos.	6,731	32,629,283	6,177,165	42,300,815	6,812,351	8,273,478	969,834	14,973,861	1,491,400	32,843,351	77.6	9,457,464	6,365,969	5,756,516	9,346,240
Alabama Great Southern	Apr.	314	596,610	90,879	740,562	141,519	158,780	18,970	225,054	25,159	575,807	77.8	164,755	103,418	135,552	234,470
	4 mos.	314	2,281,447	407,113	2,892,702	534,220	654,238	80,398	909,436	98,775	2,301,646	79.6	591,056	379,895	444,542	801,025
Cinn., New Orleans & Texas Pacific	Apr.	338	1,345,442	169,661	1,608,735	281,477	370,129	41,709	467,069	54,248	1,225,693	76.2	383,042	286,784	265,349	425,074
	4 mos.	338	5,351,876	866,677	6,592,054	1,137,964	1,451,473	161,306	1,950,123	215,338	4,971,005	75.4	1,621,049	1,252,936	1,245,030	433,307
Georgia Southern & Florida	Apr.	397	228,790	71,380	325,252	70,468	74,192	2,901	119,462	3,220	276,214	84.9	49,038	21,048	11,098	51,362
	4 mos.	397	891,011	419,351	1,427,500	275,364	293,390	9,214	510,255	11,944	1,132,389	79.3	295,111	193,892	171,679	112,737
New Orleans & Northeastern	Apr.	204	310,161	45,798	381,788	68,627	69,125	10,878	113,325	14,443	280,085	73.4	101,703	58,150	29,267	74,648
	4 mos.	204	1,227,726	210,175	1,537,190	255,041	279,322	44,772	490,522	56,447	1,140,323	74.2	396,867	220,943	70,638	315,372
Northern Alabama	Apr.	110	98,785	2,928	105,854	16,658	3,878	2,351	31,228	3,739	57,854	54.7	48,000	42,466	21,153	30,641
	4 mos.	110	366,817	15,665	394,878	88,910	14,595	9,258	124,112	12,626	249,501	63.2	145,377	122,759	42,556	80,560
Southern Pacific	Apr.	9,121	11,277,845	2,736,903	15,413,087	2,201,840	2,832,056	449,623	5,221,293	743,138	11,725,870	76.1	3,687,217	2,560,634	2,182,413	3,667,758
	4 mos.	9,123	44,257,447	11,816,800	61,371,039	8,207,255	11,784,676	1,745,121	21,163,992	2,744,396	46,699,897	76.1	14,671,142	9,659,481	8,332,230	12,969,365
So. Pacific Steamship Lines	Apr.	....	582,558	42,628	665,940	18,870	169,960	23,100	497,583	32,988	742,501	111.5	—76,561	—77,969	—74,032	93,115
	4 mos.	....	2,355,914	163,710	2,699,663	75,957	698,260	92,609	1,926,173	190,444	2,983,443	110.5	—283,780	—289,417	—274,595	132,035
Texas & New Orleans	Apr.	4,721	3,963,330	666,202	5,057,853	942,744	1,050,191	174,792	1,741,456	263,237	4,172,931	82.5	884,922	582,424	345,857	955,474
	4 mos.	4,721	16,017,245	3,046,113	20,755,600	3,763,233	4,261,886	697,407	7,158,229	1,051,246	16,965,737	81.7	3,789,863	2,563,334	1,521,219	3,118,752
Spokane, Portland & Seattle	Apr.	554	527,552	62,014	647,264	95,696	109,574	12,715	211,051	24,147	458,273	70.8	188,991	101,879	84,546	138,989
	4 mos.	554	2,000,565	269,266	2,502,230	327,036	420,680	47,007	871,900	93,904	1,782,389	71.2	719,841	371,376	317,519	594,036

Revenues and Expenses of Railways

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1929.
Tennessee Central	Apr.	296	$239,512	$10,483	$263,381	$63,816	$44,455	$9,785	$88,433	$14,213	$219,927	83.5	$43,454	$38,079	$18,499	$6,197
	4 mos.	296	904,058	41,650	1,001,455	232,842	192,372	37,059	368,999	56,736	885,925	88.5	115,530	93,925	26,445	62,807
Terminal R. R. Assn. of St. L.	Apr.	55	.....	.....	912,148	139,872	88,421	3,116	424,895	24,872	685,093	75.1	227,055	124,015	212,272	281,581
	4 mos.	55	.....	.....	3,592,033	550,903	386,359	12,181	1,721,521	112,413	2,797,837	77.9	794,196	472,817	830,600	1,198,499
Texas & Pacific	Apr.	1,955	2,787,845	370,344	3,398,389	446,173	516,557	90,624	1,024,199	131,023	2,210,128	65.0	1,188,261	1,002,014	788,917	688,728
	4 mos.	1,955	10,511,633	1,595,202	13,039,299	1,886,095	2,191,851	354,102	4,256,151	512,939	9,293,482	70.6	3,835,817	3,093,129	2,286,745	2,628,239
Texas Mexican	Apr.	162	89,684	2,555	103,805	17,842	17,771	4,532	43,217	7,189	89,643	86.3	14,162	9,158	2,386	43,944
	4 mos.	162	309,820	11,888	370,065	64,146	67,238	16,410	159,811	29,816	332,821	89.9	37,244	17,219	—12,455	43,645
Toledo, Peoria & Western	Apr.	239	169,502	339	173,595	14,308	25,640	14,691	63,814	10,671	129,124	74.4	44,471	36,768	26,709	37,339
	4 mos.	239	647,149	1,323	663,101	71,823	113,365	58,147	276,187	37,292	556,796	84.0	106,305	87,817	47,297	168,143
Toledo Terminal	Apr.	28	.....	.....	107,445	11,668	17,954	564	54,978	5,116	90,274	84.0	17,171	1,863	22,627	27,476
	4 mos.	28	.....	.....	429,322	28,622	71,416	2,308	199,902	19,318	321,513	74.9	107,809	46,001	146,756	222,109
Trinity & Brazos Valley	Apr.	367	132,340	3,786	143,015	164,850	2,183	6,374	66,582	12,794	235,876	164.9	—92,861	—100,671	—126,815	—50,244
	4 mos.	367	548,928	19,931	602,559	492,135	112,275	25,444	287,473	50,625	933,213	154.9	—330,654	—362,607	—468,886	—109,968
Ulster & Delaware	Apr.	128	38,974	2,690	81,544	13,985	12,342	1,289	37,027	3,941	68,584	84.1	12,960	7,160	4,504	10,746
	4 mos.	128	102,923	9,300	252,221	49,062	53,527	4,884	138,114	16,152	261,739	103.8	—9,518	—26,118	—31,340	—26,851
Union R. R. of Penna.	Apr.	45	.....	.....	709,140	114,580	158,621	151	338,611	14,576	626,335	88.3	82,805	45,505	86,918	183,298
	4 mos.	45	.....	.....	2,638,048	325,767	625,021	618	1,305,585	58,662	2,315,169	87.8	322,879	175,079	373,136	602,730
Union Pacific	Apr.	3,765	6,028,942	916,173	7,721,908	962,095	1,876,267	209,036	2,291,590	332,656	5,806,385	75.2	1,915,523	1,258,473	1,150,249	1,264,013
	4 mos.	3,765	23,536,961	3,667,861	30,092,742	2,920,267	7,215,657	708,348	9,542,821	1,333,099	22,252,643	73.9	7,840,099	5,064,427	4,618,503	7,300,339
Oregon Short Line	Apr.	2,538	2,138,105	206,243	2,550,978	587,909	462,157	64,171	754,109	133,129	2,052,901	80.5	498,077	183,193	99,994	401,125
	4 mos.	2,538	8,762,843	930,420	10,449,799	1,522,141	1,846,227	219,461	3,267,034	507,986	7,524,525	72.0	2,925,274	1,722,379	1,386,072	2,525,071
Oregon-Wash. R. R. & Nav. Co.	Apr.	2,364	1,545,124	154,839	1,886,760	416,198	319,475	83,201	717,433	127,707	1,679,064	89.0	207,696	16,571	—73,868	—132,235
	4 mos.	2,364	6,207,667	709,951	7,666,083	1,368,203	1,256,804	300,076	3,132,904	500,299	6,643,928	86.7	1,022,155	255,089	—104,451	—176,510
Los Angeles & Salt Lake	Apr.	1,229	1,428,132	270,152	1,877,004	343,435	321,900	88,703	589,756	86,189	1,493,759	79.6	383,245	228,134	86,263	361,609
	4 mos.	1,229	5,864,233	1,109,682	7,655,848	1,232,648	1,326,633	332,052	2,488,705	336,675	5,970,389	78.0	1,685,459	1,019,529	517,119	1,371,662
St. Joseph & Grand Island	Apr.	258	258,053	6,531	277,481	48,311	34,897	3,904	93,195	15,940	198,661	71.6	78,820	61,423	41,004	33,144
	4 mos.	258	1,066,231	29,897	1,140,836	146,939	138,678	14,172	389,256	63,512	761,131	66.7	379,705	301,472	225,038	249,486
Utah	Apr.	111	87,312	.....	87,484	20,281	29,731	394	22,013	5,837	78,256	89.4	9,228	4,665	—4,296	34,743
	4 mos.	111	612,772	.....	616,783	89,131	150,147	1,444	155,531	24,926	421,179	68.3	195,604	154,374	83,886	257,320
Virginian	Apr.	545	1,339,308	21,577	1,445,474	162,332	263,961	13,778	301,977	33,190	775,435	53.6	670,039	515,040	566,073	553,424
	4 mos.	545	5,752,593	101,813	6,205,448	640,351	1,135,016	55,509	1,273,039	128,512	3,236,717	52.2	2,968,731	2,306,731	2,576,745	2,766,787
Wabash	Apr.	2,523	4,890,251	436,826	5,724,728	797,849	977,636	184,091	2,180,298	233,952	4,368,921	76.3	1,355,807	1,078,765	707,867	810,147
	4 mos.	2,523	18,492,857	1,898,374	21,853,190	2,405,147	3,908,940	768,667	8,980,462	963,203	17,087,199	78.2	4,765,991	3,802,967	2,324,180	4,027,610
Ann Arbor	Apr.	293	389,989	9,980	411,706	41,115	88,875	14,122	174,961	11,983	331,228	80.5	80,478	55,254	35,032	72,764
	4 mos.	293	1,583,719	45,316	1,675,505	140,511	355,105	56,708	719,058	47,103	1,318,365	78.7	357,140	252,413	141,267	343,751
Western Maryland	Apr.	896	1,368,713	14,487	1,460,816	204,403	267,372	48,873	390,141	41,902	961,101	65.8	499,715	409,715	429,745	368,932
	4 mos.	893	5,758,579	70,171	6,054,495	810,489	1,144,517	177,024	1,667,175	172,367	3,987,989	65.9	2,066,506	1,716,506	1,820,032	1,671,262
Western Pacific	Apr.	1,051	923,768	85,363	1,101,012	394,858	223,943	70,313	444,165	49,742	1,209,867	109.9	—108,855	—208,948	—186,059	148,373
	4 mos.	1,051	3,822,723	278,367	4,388,683	1,157,653	1,030,848	271,999	1,810,663	195,640	4,557,426	103.8	—168,743	—574,908	—400,778	542,800
Wheeling & Lake Erie	Apr.	511	1,378,176	15,209	1,479,222	197,069	400,243	37,872	427,227	45,967	1,109,502	75.0	369,720	246,217	245,257	422,083
	4 mos.	511	5,153,542	69,405	5,525,708	594,145	1,473,548	153,245	1,696,760	184,379	4,107,003	74.3	1,418,705	923,217	954,198	1,468,074
Wichita Falls & Southern	Apr.	203	89,496	739	95,126	16 665	10,067	2,777	27,344	6,731	62,411	65.61	32,715	27,531	21,171	2,137
	4 mos.	203	307,190	2,433	327,153	58,844	42,392	11,604	108,242	22,343	242,252	74.05	84,901	63,841	41,033	56,133

News of the Week

(Continued from page 1439)

the matter is receiving the earnest attention of Congress and that no further action should be taken by the commission until Congress shall have had an opportunity to conclude its study of this very important subject."

The committee has not given any indication of an intention to hold public hearings on the bill but has arranged to hear some of the members of the commission in executive session on June 12.

Bill for Settlement of Government Loans Reported

A bill to give the Secretary of the Treasury, with the concurrence of the Interstate Commerce Commission, discretionary power to compromise or exchange indebtedness of railroads to the federal government arising from loans made under section 210 of the transportation act of 1920, where the debtor roads are in the hands of receivers, was favorably reported by the Senate committee on interstate commerce on June 9. The bill, S. 4254, was introduced by Senator Smoot, of Utah, and has the approval of the Interstate Commerce Commission as well as that of the Secretary of the Treasury, with certain amendments made by the Senate committee. The bill provides for arrangements either with receivers, reorganization committees or reorganized companies, and authorizes the government to purchase or subscribe to securities to the extent required or permitted by reorganization plans.

In a report to the committee the Interstate Commerce Commission furnished a statement showing that of approximately $350,000,000 loaned to carriers under section 210 all but $49,602,089 has been repaid, and the amount of principal in default is only $398,056, while the interest in default amounts to $2,881,636. This makes a total of $3,279,692 in default, which is owed by 14 railway companies, and is less than one per cent of the amount loaned. The largest amount in default is $1,040,154 of interest owed by the Missouri & North Arkansas on a loan of $3,500,000. The Minneapolis & St. Louis is in default of $558,527 of interest and the Waterloo, Cedar Falls & Northern owes $637,343 in interest. Only six roads are in default as to the principal of the loans, the largest amount being $106,000. There are 23 loans outstanding.

More Rail Joints and Tie Plates Produced in 1929

The American Iron and Steel Institute, New York, has just issued statistics showing the tonnage of various forms of iron and steel products which was produced in the United States in 1929 and with comparisons with other years added. Included among these statistics is a table showing the production of tie plates and rail joints for 1928 and 1929. This table follows:

	1928—Gross Tons			1929—Gross Tons		
Kinds	Iron	Steel	Total	Iron	Steel	Total
Angle splice bars	8,144	175,461	183,605	10,195	184,030	194,225
Tie plates	56,853	486,253	543,106	47,713	556,045	603,758
Fish plates	174	5,208	5,382	176	3,524	3,700
Other rail joints	....	21,270	21,270	.....	16,929	16,929
Total	65,171	688,192	753,363	58,084	760,528	818,612

These figures show that in 1929 the production of angle splice bars increased 10,620 tons and of tie plates 60,652 tons over 1928, while the production of fish plates decreased 1,682 tons and other rail joints 4,341 tons.

The statistics also show that the production of steel railroad ties in 1929 was 13,718 gross tons, which is only a slight variation from that in any year since 1925, with the exception of 1928, being 1,452 tons greater than in that year. The production of steel ingots and castings for all purposes was 56,433,473 gross tons which is the highest for any year on record, being 4,889,293 tons greater than in 1928, the highest previous year.

Banquet is Staged in Enginehouse

On June 4, the Detroit & Toledo Shore Line celebrated the completion of an installation of Direct Steaming at its engine terminal in Toledo, Ohio, by staging a banquet in an 8-stall section of the enginehouse. During the dinner and the ceremonies which followed, the remainder of the 24-stall enginehouse was in full operation. One of the special features of the arrangements was the serving of the dinner around two locomotives which were being held under steam, without fires on their grates.

More than 400 invited guests were present, many of whom were officers of the railways entering Toledo. The party also included municipal officers and chiefs of smoke inspection bureaus from Toledo and surrounding cities, and representatives of many of the industries of the city.

The ceremonies began with an automobile parade from the heart of the business district, starting at 5:15 p.m. and ending at the engine terminal where the banquet was served at 6 o'clock. Three features of the installation were noted particularly by the guests: The absence of the familiar smoke jacks; the complete elimination of smoke, steam and gases from the enginehouse; and the fact that the regular lighting system in the enginehouse was adequate for the occasion, so that no supplemental lighting was necessary.

C. G. Bowker, president, D. & T. S. L., presided as toastmaster. Short talks were made by representatives of the manufacturers who had furnished equipment and supplies for the installation and by representatives of the mechanical departments of the railways entering Toledo. Among the latter was Joel De Vault, general foreman, New York, Chicago & St. Louis, who is also president of the Toledo Smoke Abatement League. The principal speaker of the evening was Henry Kreisinger, engineer, Combustion Engineering Company, New York, who, in keeping with the occasion, discussed "What Soot Is, What Causes It and How It Can Be Eliminated or Minimized."

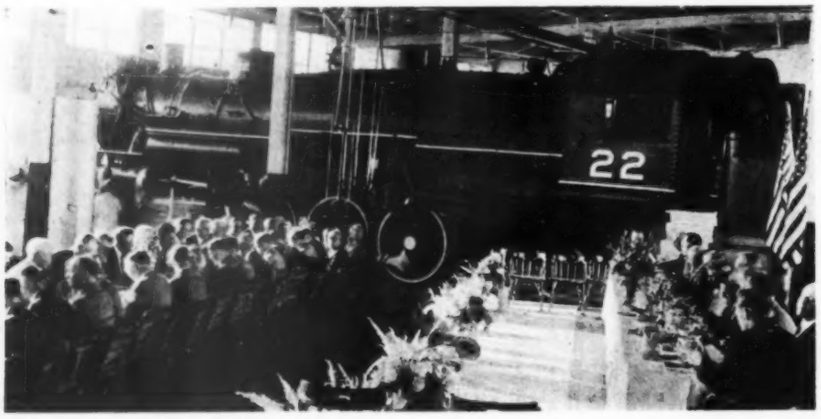


Photo by Stewart Hooker, Toledo Blade

Detroit & Toledo Short Line Serves Banquet in Enginehouse

Revenues and Expenses in April and for Four Months

Class I railroads in the first four months of 1930 had a net railway operating income of $238,507,532, which was at the annual rate of return of only 3.56 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. This was a decrease of 32.5 per cent as compared with the net in the first four months of 1929, which was $353,439,683, or 5.39 per cent. Operating revenues totaled $1,783,304,189, compared with $1,996,319,769 for the same period last year, or a reduction of 10.7 per cent; operating expenses $1,386,713,499, a reduction of six per cent.

In the first four months these roads paid $118,479,946 in taxes, compared with $128,610,077 for the same period the year before. For April alone, the tax bill amounted to $30,094,098, a decrease of $2,925,964 under the previous year.

Thirty-one Class I railroads operated at a loss in the first four months of 1930, of which 10 were in the Eastern district,

two in the Southern and 19 in the Western.

Net railway operating income by districts with the percentage of return based on property investment on an annual basis was as follows:

	Income	Per cent
New England Region	$14,517,442	5.35
Great Lakes Region	43,487,953	3.21
Central Eastern Region	55,136,084	4.01
Pocahontas Region	23,669,667	7.90
Total Eastern District	$136,811,146	4.14
Total Southern District	$33,010,830	2.94
Northwestern Region	$8,181,404	1.61
Central Western Region	38,830,492	3.42
Southwestern Region	21,673,660	3.41
Total Western District	$68,685,556	3.01
United States	$238,507,532	3.56

Roads in the Eastern district for the four months had a net of $136,811,146, making the annual rate 4.14 per cent; four months net last year was $187,938,561, or 5.83 per cent. In April in the Eastern district the net amounted to $37,935,744, compared with $51,696,274 in April, 1929.

Roads in the Southern district for the four months had a net of $33,010,830; annual rate 2.94 per cent; for the same period in 1929, net amounted to $48,300,839, or 4.35 per cent. The net in April amounted to $7,993,296, while in the same month in 1929 it was $13,530,061.

Roads in the Western district for the first four months had a net of $68,685,556; annual rate, 3.01 per cent; four months last year, had a net $117,200,283, or 5.27 per cent. For April, the net in the Western district amounted to $16,342,544; April, 1929, $28,942,039.

CLASS I RAILROADS—UNITED STATES

	Month of April 1930	1929
Total operating revenues	$451,203,155	$514,700,445
Total operating expenses	348,214,358	377,045,331
Taxes	30,094,098	33,020,062
Net railway operating income	62,271,584	94,168,374
Operating ratio—per cent	77.17	73.26
Rate of return on property investment, per cent	3.81	5.88
	Four months ended April 30	
Total operating revenues	$1,783,304,189	$1,996,319,769
Total operating expenses	1,386,713,499	1,475,466,990
Taxes	118,479,946	128,610,077
Net railway operating income	238,507,532	353,439,683
Operating ratio—per cent	77.76	73.91
Rate of return on property investment, per cent	3.56	5.39

THE CHICAGO & EASTERN ILLINOIS about July 1 will establish a new train between Chicago and St. Louis, which has been named the Zipper. The new train will be equipped with coaches, parlor cars and a combination dining-lounge car which will have several innovations in service. The schedule provides for departure from Chicago at 3:05 p.m., and arrival at St. Louis at 10 p.m. Northbound the train will leave St. Louis at 8:45 a.m., arriving in Chicago at 3:35 p.m. A contest was held to provide a suitable designation for the train and the name selected was submitted by Mrs. Lloyd Hughes, Virginia, Ill.

Traffic

The Missouri-Kansas-Texas, through a newly organized subsidiary, the Missouri-Kansas-Texas Transportation Company, has made arrangements to establish freight and express delivery and pick-up service along its lines in Texas.

Allegheny Advisory Board

The Allegheny Regional Advisory Board held its regular meeting at Morgantown, W. Va., on June 12. The reports of the commodity committees predicted a demand during the quarter beginning July 1, for 1,082,261 cars, equal to 3.1 per cent less than the number that was required in the third quarter of last year. Numerous committees predicted increases in the volume of traffic, those in which the increase is five per cent or more being: Agricultural implements, etc., 14.3 per cent; cement, 28.8; coal, Eastern Ohio district, 7.3; flour, meal, etc., 10; grain, 5; lime, 7.6; stone, 17.7; petroleum, etc., 9.5 per cent.

Reductions in the volume of freight are predicted as follows: Coke, 27 per cent; lumber, etc., 14.5; iron and steel, 7.5; brick and clay products, 9.3 per cent.

The banking committee reported the general condition of business throughout the Board's territory as being fair to good.

Low Fares to Memphis

To meet motor coach competition the St. Louis-San Francisco and the Illinois Central have placed in effect a six-dollar round trip passenger rate between St. Louis, Mo., and Memphis, Tenn., subject to a two day limit. It is valid in Pullman cars upon the payment of the usual charges and compares with the standard one-way railroad fare of $11.19 and the one way motor coach fare of six dollars. The fare also applies to certain intermediate points in each direction. The Frisco operates three trains each way daily between St. Louis and Memphis, while the Illinois Central operates six trains northbound and five southbound. The Southwestern Transportation Company, a subsidiary of the St. Louis Southwestern, began motor coach service between those points on June 1, with two trips each way daily.

Southeast Shippers' Advisory Board

The Southeast Shippers' Advisory Board met at Knoxville, Tenn., on June 6. The reports of commodity committees predict considerable fluctuations in the movement of freight. Brick, lumber and other building materials are expected to fall off 15 per cent in the third quarter of 1930 as compared with July, August and September of last year; but cement, crushed stone, etc., will probably increase from 5 to 10 per cent. Iron and steel will be unchanged, so far as can be foreseen. Decreases are expected in coal and coke, 10 per cent; furniture 20 per cent; naval stores and textiles, slight.

The use of gasoline continues to increase and the petroleum industries ex-

* * * *

The British Railway Companies' Railway Transport Advisory Bureau in the London Section of the British Industries Fair, Held at Olympia, (England) from February 17 to 28

pect a movement of five per cent above 1929; and pulp paper, etc., will probably increase 19 per cent.

The peach crop is expected to be larger than last year and the watermelon crop at least equal to 1929; and a net increase of 10 per cent is expected in the aggregate of fresh fruits. Potatoes and other fresh vegetables will probably move in a little greater volume; but cotton, etc., is expected to fall off 15 per cent; fertilizer movement unchanged.

Pacific Northwest Shippers' Board

The 33 commodity reports presented at the Pacific Northwest Shippers' Advisory Board meeting at Spokane, Wash., on June 6, indicate that car requirements for freight loading in Washington, Oregon and Idaho in the third quarter of 1930 will be about 5.9 per cent less than those of the corresponding quarter of 1929. It was estimated that lumber would require 10 per cent less cars. Fewer cars will also be needed for canned fruits, clay products, hay, iron and steel and poultry. Commodities for which an increased number of cars will probably be requested, as compared with 1929, included cement, 5 per cent; concrete products, 4 per cent; chemicals, 33 per cent; fresh fruit, 12 per cent; livestock, 6 per cent; paper and pulp products, 8 per cent, and vegetables, 9 per cent. An increased use of motor trucks for moving freight was noted in the reports of the automotive and agricultural implements committees.

Subsidy for Canadian Coal

Terms by which the interprovincial movement of Western Canada bituminous coal will be subsidized by the Dominion government, were announced last week at Ottawa, by Hon. Charles Stewart, Minister of the Interior. By an order-in-council signed by the Governor-General, coal mined in the Crow's Nest pass district of British Columbia and in the bituminous and sub-bituminous area of Alberta and shipped to points in the province of Manitoba will be subject to a reduction of freight rates which will enable it to compete with foreign coal. The assistance to the industry will be $1 a ton, effective for one year, beginning June 5. The reduced rate will be applicable to coal used for domestic and industrial purposes.

Another order-in-council will give assistance of fifty cents a ton on briquettes and lignite coal in carbonized form mined in Saskatchewan and shipped to Manitoba. This reduction is applicable only when briquettes are used for domestic or industrial purposes. It will apply for one year, commencing June 1.

The administration of these assisted movements of coal will be under the direction of the Dominion Fuel Board. Regarding the British Columbia and Alberta coal, it was announced the rate reduction will apply only if the coal has less than 12 per cent moisture and a calorific of more than 11,000 B. t. u. per pound in the raw state.

Equipment and Supplies

Locomotives

THE ILLINOIS STEEL COMPANY is inquiring for five oil-electric locomotives of the 4-0-4 type.

THE CANADIAN PACIFIC has ordered ten 4-6-4 type locomotives from the Montreal Locomotive Works, Ltd. These locomotives will have 22 by 30-in. cylinders, 75-in. driving wheels, and a total weight in working order of 352,000 lb.

THE CANADIAN NATIONAL has ordered two locomotives of the 4-6-4 type from the Montreal Locomotive Works, Ltd. These locomotives will have 23- by 28-in. cylinders and a total weight in working order of 341,000 lb. A previous order for three 4-6-4 type locomotives was given to the same builder.

Passenger Cars

THE BOSTON & MAINE-MAINE CENTRAL are inquiring for nine steel de luxe coaches 72 ft. long and four combination baggage and smoking cars.

Freight Cars

THE REPUBLIC IRON & STEEL COMPANY is inquiring for from 15 to 18 gondola car bodies of 70 tons' capacity.

THE FREEPORT SULPHUR COMPANY is inquiring for ten steel hopper bottom gondola cars of 50 tons' capacity.

WAUGH BROTHERS, INC., Nicholasville, Ky., has ordered ten air dump cars of 20-yd. capacity from the Koppel Industrial Car & Equipment Company.

THE DUQUESNE SLAG PRODUCTS COMPANY, Pittsburgh, Pa., has ordered one air dump car of 30-yd. capacity from the Koppel Industrial Car & Equipment Company.

THE UNION PACIFIC has ordered 20 ore cars of 70 tons' capacity from the St. Louis Car Company. Inquiry for this equipment was reported in the *Railway Age* of May 3.

THE WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY has ordered six air dump cars of 30-yd. capacity from the Koppel Industrial Car & Equipment Company.

THE ERIE has ordered 50 gondola cars of 70 tons' capacity from the Pressed Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of April 26.

THE NORTH WESTERN REFRIGERATOR LINE COMPANY will build 50 refrigerator cars in its own shops. An order for the underframes for these cars has been given to the American Car & Foundry Company.

THE ERIE has ordered 150 steel Hart selective ballast type cars of 70 tons' capacity from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of April 19.

Machinery and Tools

THE SOUTHERN PACIFIC has ordered one car axle journal and axle lathe for the Texas & New Orleans from Manning, Maxwell & Moore, Inc.

THE ATCHISON, TOPEKA & SANTA FE has ordered two 90-in. journal turning, quartering and pin turning machines from Manning, Maxwell & Moore, Inc.

Iron and Steel

THE CHICAGO & NORTH WESTERN has ordered 5,000 tons of steel for an express building at Chicago from the American Bridge Company.

THE NEW YORK CENTRAL has ordered 700 tons of steel for a viaduct at Sixty-Fifth street, New York, from the McClintic-Marshall Company.

THE CHICAGO GREAT WESTERN has ordered 2,800 tons of steel for its 1930 bridge program from the American Bridge Company, the McClintic-Marshall Company and the Pittsburgh-Des Moines Steel Company.

Signaling

THE INDIANAPOLIS UNION plans the installation of an interlocking plant at the east entrance to the Union station at Indianapolis, Ind., at a cost of about $290,000.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company an electric interlocking machine, model 5A, for Black Rock, N. Y., 32 working levers and 16 spare spaces.

THE BALTIMORE & OHIO has ordered from the General Railway Signal Company an electric interlocking for installation at Terre Alta, W. Va. This order includes a 56-lever machine, model 2, and 19 switch machines.

THE ATLANTIC COAST LINE has ordered from the Union Switch & Signal Company material for the installation of automatic block signals on its line between Yukon, Fla., and Orange City Junction, and between Sanford, Fla., and Winter Park; aggregate length of road 120 miles, single track. Searchlight signals will be used.

Miscellaneous

THE CANADIAN NATIONAL plans the construction of a steel car ferry for service between Port Mann, B. C., and Vancouver Island. The ferry will be 279 ft. long and 42 ft. beam with a capacity of 17 freight cars on three tracks.

Supply Trade

Russell B. Arnold, 140 South Dearborn street, Chicago, has been appointed mid-west sales representative of the **Howard P. Cook Company,** Bridgeport, Conn., to handle the Greer snow melting devices.

William E. Balliet has been appointed manager of the Birmingham, Ala., office of the **Blaw-Knox Company,** Pittsburgh, Pa., to succeed **P. V. Kelly,** and **Joseph Riley** has been appointed assistant manager of the district.

The Prest-O-Lite Company, Inc., New York, has opened a new plant for the manufacture of dissolved acetylene at 1240 Stewart avenue, S. W., Atlanta, Ga., and the old plant at 345 Kuhrt street, Atlanta, has been discontinued.

W. L. Lewis, formerly assistant comptroller of the Bethlehem Steel Corporation, has been elected vice-president, secretary and treasurer of the **Chicago Pneumatic Tool Company,** New York, succeeding **J. G. Grimshaw,** secretary and treasurer, resigned.

The Independent Pneumatic Tool Company, Chicago, has purchased the **Cochise Rock Drill Manufacturing Company,** Los Angeles, Cal., which will be operated by the former company as a unit of its organization, with no change in personnel.

George E. Kingsley, who has been in charge of office and plant operation of the **Magnetic Signal Company,** Los Angeles, Cal., has been appointed general manager. Mr. Kingsley has been connected with the Magnetic Signal Company for 11 years.

The Symington Company and the **Gould Coupler Company,** New York, have opened a sales office in the Terminal Tower building, Cleveland, Ohio. **Hynes Sparks,** assistant vice-president of both companies, formerly at New York, is in charge of the Cleveland office.

George H. Lanborn, formerly production manager of the Chicago plant of the **Morrison Railway Supply Corporation,** Buffalo, N. Y., has been appointed supervising engineer of the manganese frog and crossing reconditioning department of that company. Mr. Lanborn's headquarters will be at Chicago.

The Blaw-Knox International Corporation is the new name for the export organization of the Blaw-Knox Company, which was formerly known as the Milliken Brothers—Blaw-Knox Corporation, which in turn succeeded the original Milliken Brothers Manufacturing Company. The change of name embraces no change in personnel and the offices will remain as formerly, in the Canadian-Pacific building, New York City. The Blaw-Knox International Corporation handles all the products of the Blaw-Knox Company in South America, the West Indies and other parts of the world where the Blaw-Knox Company is not otherwise represented.

Robert S. Hammond, district manager of the Chicago district for the **Whiting Corporation,** Harvey, Ill., has been appointed sales manager of that company. **R. E. Prussing,** vice-president at Cleveland, Ohio, has been transferred to Chicago in charge of the office in that city. **R. H. Moore** has been appointed district manager at Cleveland. Mr. Hammond has been connected with the Whiting Corporation for 11 years. He graduated from a course in mechanical engineering at the University of Michigan

Robert S. Hammond

in 1911 and gained his first business experience with the American Steel Foundries at Granite City, Ill. Two years later he entered the sales department of that company at Chicago, first in the railway specialty sales department and then as a sales agent. Mr. Hammond was placed in charge of the Pittsburgh (Pa.) territory of the Whiting Corporation in 1919, and in 1921 he was appointed district manager of the Chicago district for that company.

Charles Edward Brown, Jr., for the past five years manager of the power and light department of the Chicago branch of **The Okonite Company,** Passaic, N. J., has been appointed assistant to the general manager of the company, with headquarters at New York. Mr. Brown is a graduate of Princeton University, class of 1917. He joined the United States Air Service during the war and served for nine months in England and seven months in France. Upon his return to America he joined the sales staff of the Central Electric Company, Chicago, and when he left that organization was manager of sales for the district outside of Chicago. Mr. Brown has had extensive experience in the sale of wire and cables for industrial plants, steam and electric railroads and in the central station business. **Elbridge H. McNeill** has been appointed manager of the power and light department of the Chicago branch to succeed

Charles Edward Brown, Jr.

Mr. Brown. Mr. McNeill has had a long engineering experience in the selling and servicing of insulated cables. After leaving Chicago University in 1915, he entered the employ of the Central Electric Company, Chicago, where he became manager of the Okonite de-

Elbridge H. McNeill

partment. In 1925, when The Okonite Company opened its Chicago branch, he joined that organization where he specialized in sales engineering work, devoting all his time to railroad, industrial and public utility accounts.

Obituary

Lyle H. Rupert, service engineer of the Franklin Railway Supply Company, Inc., New York, died at El Paso, Tex., on May 29. Mr. Rupert had been a member of the Franklin service staff since September 1, 1923, operating in Texas, New Mexico, Arizona and Mexico. He also made an extended trip to South America in 1924 to supervise the installations of locomotive boosters and other Franklin devices on the Chilean State Railways, the Mogyana Railway of Brazil and the Brazilian State Railways.

Construction

ALGOMA CENTRAL & HUDSON BAY.—A contract has been awarded to Robert Lang & Sons, Sault Ste. Marie, Ont., for the construction of two 40-ft. arches and eight culverts near Sault Ste. Marie at a cost of about $40,000.

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of an extension from Amarillo, Tex., to Boise City, Okla., about 120 miles, part of the projected line between Amarillo and Las Animas, Colo., has been let to Sharpe & Fellows, Los Angeles, Cal. This contract covers the complete construction of the finished line. A contract for the construction of one-story brick bunk houses at Peabody, Kan., and Wilder, each 14 ft. by 112 ft., has been let to Lundgren & Carlson, Topeka, Kan.

BALTIMORE & OHIO.—The installations of automatic block signals and other improvements now being made on the line from Lima, Ohio, northward to Toledo, 69 miles, are expected to make possible the elimination of 36,500 freight train stops and 9,855 passenger train stops annually; and the lengthening of side tracks will permit the running of longer freight trains so that the saving in train miles is expected to aggregate 54,750 annually. The automatic signals will be of the color-position-light type. About seven miles of second main track is being laid between Bates and Roachton. The switches of passing tracks will be electrically operated from nearby stations or towers. The number of block sections will be 54, taking the place of 14 manual-block offices. The plans provide for four new interlocking plants at Cairo, Leipsic Junction, Custar and Roachton, and the rearrangement of six plants at Columbus Grove, Leipsic, Deshler, Tontogany, Bates and Pennsylvania Junction (Toledo); and provision is made for remote operation of junction and passing siding switches at North Lima, Cairo, Columbus Grove, Ottawa, Leipsic Junction, Belmore, Deshler, Custar, Weston, Tontogany, Haskins and Roachton. The estimated total cost of these improvements is $1,133,000.

BEAVER, MEADE & ENGLEWOOD—The general contract for the construction of 40 miles of railroad from Hough, Okla., to Keyes, has been awarded to the Panhandle Construction Company, Oklahoma City, Okla. This contract also includes track laying.

CENTRAL OF GEORGIA.—This company has received bids for the construction of a warehouse and office building, to cost approximately $25,000, at Macon, Ga.

CHICAGO & NORTH WESTERN.—The Cargill Commission Company, Minneapolis, Minn., has awarded a general contract to the Fegles Construction Company, Minneapolis, for the construction of a 5,000,000-bu. grain elevator at Omaha, Neb., on a site leased from this railroad. A contract for the driving of piling has been let to E. A. Whitney & Co., Kansas City, Mo. The entire project will involve an expenditure of about $3,000,000. It will be operated by the Cargill Commission Company and will be served by North Western trackage.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—A contract has been let by the city auditor of Sioux Falls, S. D., to Peppard & Fulton, Superior, Wis., for the construction of a 900-ft. reinforced concrete and steel viaduct over the tracks of this railroad, the Chicago, St. Paul, Minneapolis & Omaha and the Great Northern at Sioux Falls. The cost of the structure will be about $160,000.

CHICAGO, ROCK ISLAND & PACIFIC—MISSOURI PACIFIC.—A contract for the construction of a reinforced concrete viaduct to carry a city street over the tracks of these railroads and Rose Creek at Little Rock, Ark., has been awarded to the Luten Bridge Company, Little Rock, at a cost of $127,000.

CHICAGO, ROCK ISLAND & PACIFIC—ST. LOUIS-SAN FRANCISCO.—The Interstate Commerce Commission has re-opened for further argument on July 9 the case in which it recently authorized the construction by subsidiaries of these companies of 150 miles of new line in Texas, which, together with the acquisition of control of the Gulf, Texas & Western by the Frisco and the use of trackage rights, would create a shorter route from northern Texas and southwestern Oklahoma to Fort Worth and Dallas, Tex. The case was re-opened on petitions of the Fort Worth & Denver Northern and civic organizations of Childress and Pampa, Tex., as the commission denied the application of the Burlington subsidiary for authority to build a line between those two points, 110 miles.

ELGIN, JOLIET & EASTERN.—A contract has been let to the Roberts & Schaefer Company, Chicago, for the construction of a 300-ton two-track coaling station with coal crushing facilities, at Ingalton, Ill.

NEW YORK CENTRAL.—Contracts have recently been awarded by this company as follows: To Edward J. Duffy Company, Inc., New York, for the construction of canopies, platforms, and other work for milk-handling facilities at Weehawken, N. J.; to Babor-Comeau & Company, New York, for the construction of a signal station to be designated as MO tower, at Mott Haven Junction, N. Y.; to Aronberg-Fried Company, New York, for the construction of substation No. 10 at Dyckman street, New York City; to Bates & Rogers Construction Company, Inc., New York, for the elimination of the Thompson Road crossing, Syracuse, N. Y., and to E. P. Muntz, Inc., Buffalo, N. Y., for the reconstruction of bridge T-15 carrying Park avenue, Blasdell, N. Y., over the New York Central's Gardenville branch.

NEW YORK, NEW HAVEN & HARTFORD—The New York Public Service Commission has approved a plan filed by this company for widening to approximately 60 ft. the present 30 ft. roadway on Scott's bridge carrying Lincoln avenue over the New York, New Haven & Hartford tracks in Mt. Vernon, N. Y. The cost of the railroad's share of the work is estimated at $45,400.

NEW YORK, NEW HAVEN & HARTFORD.—This company has authorized an expenditure of $40,000 for the provision of additional fire protection at its shops at New Haven, Conn., and has awarded a $30,000 contract to the Foskett & Bishop Company of New Haven for the installation of a fire protection system on the Poughkeepsie bridge at Poughkeepsie, N. Y.

PITTSBURGH & LAKE ERIE.—This company plans the construction, at a cost of approximately $40,000, of a yard office building at McKee's Rocks, Pa.

PITTSBURGH & WEST VIRGINIA.—A contract has been awarded to the Vang Construction Company, Cumberland, Md., for the building of approximately six miles of new line, extending from a point on this company's Connellsville extension, now under construction, near its crossing of Pigeon creek, to a connection with the Donora Southern at Baird, Pa. The amount of the contract is approximately $1,500,000.

ST. LOUIS-SAN FRANCISCO.—This company closed bids on June 10 for the construction of an extension of its Shamrock branch in a northerly direction to Drumright, Okla., 3 miles.

ST. LOUIS SOUTHWESTERN.—A contract for the grading for the construction of 15 miles of new line between Truman, Ark., and Caraway, about 15 miles, a part of the new line which will provide a through route between St. Louis, Mo., and Memphis, Tenn., has been awarded to Reid & Lowe, Birmingham, Ala. This contract involves about 200,000 cu. yd. of excavation. Track laying, ballasting and construction of bridges and trestles will be undertaken by company forces, and the complete construction of the 15 miles of line will involve an expenditure of about $800,000.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—This company plans the construction of a thirteen-story merchandise mart between Twelfth, Thirteenth, Spruce and Poplar streets, St. Louis, Mo., at a total cost of about $5,000,000. The structure, which will have a tower with a total height of 16 stories, will have outside dimensions of 330 ft. by 358 ft. and a total floor space of about 1,500,000 sq. ft. The building will be operated by the St. Louis Mart, Inc.

VIRGINIAN & WESTERN.—This company, a subsidiary of the Virginian, has awarded a contract for the construction of seven miles of new line to Walton Sudduth Company, Bluefield, W. Va. This work is a continuation from M.P. 26 to M.P. 33 of the Guyandot river line, now being built by the Virginian, westward from Elmore, W. Va., to a connection with the Chesapeake & Ohio at Gilbert.

Railway Finance

BALTIMORE & OHIO.—*Asks More Time to Dispose of Western Maryland.*—This company has filed with the Interstate Commerce Commission a petition for an extension of time for at least six months from July 13 in which to dispose of its stock in the Western Maryland, of which the commission ordered it to divest itself by that date on the ground that it had been acquired in violation of the Clayton law. The petition points out that the Western Maryland is assigned in the commission's consolidation plan to the Wabash-Seaboard system and that, as the Wabash is controlled by the Pennsylvania, it is not now possible to create a Wabash-Seaboard system which would be independent. It states that the B. & O. is willing to comply with the commission's order but that it is unable at this time to effect a sale to a railroad in accordance with the consolidation plan or with any assurance of an ultimate purchaser in accordance with the plan as it stands or as it may be modified.

CANADIAN NATIONAL.—*Bonds.*—This company has sold to a syndicate, headed by the Chase Securities Corporation of New York, an issue of $50,000,000 of 25-year, 4¾ per cent guaranteed gold bonds. The proceeds will be used for refunding maturing obligations, the repayment of temporary loans and for other purposes such as the construction of new branch lines and general betterment work. The bonds are to be dated June 15, 1930, to mature June 15, 1955, and were offered by the syndicate to the public at 99 and interest.

COLORADO & SOUTHERN.—*Abandonment Application Denied.*—The Interstate Commerce Commission has denied this company's application for authority to abandon 185 miles of narrow-gage line in Colorado without prejudice to its renewal after 36 months if the company can show that the situation has not materially improved. The commission also denied an application filed by the board of water commissioners of the city and county of Denver asking that the railroad be permitted to abandon a portion of its Platte Canyon line from Watertown to Buffalo, Colo., 19.2 miles, so that the canyon might be used for the purpose of providing an increased water supply for Denver. The railroad application was filed after the other, on the ground, among others that the abandonment of the canyon line would prevent all through traffic between Denver and points on the line west of the abandoned segment. Although the city had offered to bear the cost of relocating the canyon line the company alleged that because of the character of the country this would not be practicable. The commission says that the record, showing continuing losses in large amounts from the operation of the line for many years, would justify the issuance of the certificate sought, but that it must consider the needs of the communities served and their showing as to future prospects of traffic for the railroad. It is suggested that meantime possible economies in operation may be effected and that possibly the co-operation of the state through reduction in taxes can be obtained. "The public served by the road should realize," the report says, "that the continuation of the service is dependent primarily on the traffic furnished. If the people desire to retain the service of the railroad they will no doubt appreciate the necessity of providing it with sufficient traffic to enable it to live."

DENVER & RIO GRANDE WESTERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of $718,000 of refunding and improvement 5 per cent mortgage bonds, series B. The proceeds are to be used to reimburse the company for capital expenditures made on the Rio Grande Junction Railway.

DENVER & RIO GRANDE WESTERN.—*Van Sweringen Representatives Seek Authority to Serve as Directors.*—O. P. Van Sweringen and other representatives of the Van Sweringen interests who were recently elected directors of the Missouri Pacific, have applied to the Interstate Commerce Commission for authority to serve also as directors of the Denver & Rio Grande Western and affiliated companies.

GEORGIA & FLORIDA.—*Receivers' Certificate.*—W. V. Griffith and H. W. Purvis, receivers of this company, have been authorized by the Interstate Commerce Commission to issue $500,000 of receivers' certificates, series A, to be sold at not less than 95 per cent of par and accrued interest. At the same time action was deferred on a supplemental application of the receivers to issue an additional $100,000 of receivers' certificates while accompanying order was issued vacating the commission's order of December 14, 1929, which had previously authorized the receivers to issue $100,000 of receivers' certificates to be designated series A.

GEORGIA, SOUTHWESTERN & GULF.—*Acquisition and Operation.*—This company has been authorized by the Interstate Commerce Commission to acquire and operate a 4-mile line owned by the Southern Line Products Company in Crisp County, Ga.

GREAT NORTHERN.—*Annual Report.*—The 1929 annual report of this road shows net income after interest and other charges of $25,668,551, as compared with net income in 1928 of $25,168,230. Selected items from the income statement follow:

	1929	1928	Increase or decrease
Average Mileage operated	8,388	8,277	+ 111
RAILWAY OPERATING REVENUES	125,932,808	126,737,091	— 804,283
Maintenance of way	17,073,972	18,319,757	—1,245,785
Maintenance of Equipment	20,278,320	18,991,651	+1,286,669
Transportation	38,351,284	39,374,519	—1,023,235
TOTAL OPERATING EXPENSES	82,862,910	83,235,116	— 372,205
NET REVENUE FROM OPERATIONS	43,069,898	43,501,975	— 432,078
Railway tax accruals	9,201,154	10,297,997	—1,096,843
Railway operating income	33,851,563	33,190,062	+ 661,501
Equipment rents — Net Dr.	991,448	1,517,996	— 526,548
Joint Facility rents — Net Dr.	402,591	377,996	+ 24,595
NET RAILWAY OPERATING INCOME	32,457,523	31,294,069	+1,163,454
Non-operating income	12,026,227	13,032,123	—1,005,896
GROSS INCOME	44,483,750	44,326,192	+ 157,558
Rent for leased roads	1,829	105,067	— 103,238
Interest on funded debt	18,220,132	18,397,673	— 177,541
TOTAL DEDUCTIONS FROM GROSS INCOME	18,815,199	19,157,962	— 342,763
NET INCOME	25,668,551	25,168,230	+ 500,322

GREAT NORTHERN.—*Bonds.*—This company has been granted authority by the Interstate Commerce Commission to issue $10,000,000 of general mortgage 4½ per cent bonds, series E. The bonds are to be issued in lieu of a like amount of 4½ per cent bonds, series D, previously authorized, and are to be sold at not less than 95 per cent of par and accrued interest. The proceeds will be used to place in the railroad's treasury funds for necessary expenditures.

GULF, MOBILE & NORTHERN.—*Bonds.*—Kuhn, Loeb & Company is offering to the public an issue of $3,000,000 of this company's first mortgage 5 per cent gold bonds, series C. The issue, which is due October 1, 1950, is offered at 99.5 and accrued interest.

ILLINOIS TERMINAL. — *Acquisition.* — This company has been authorized by the Interstate Commerce Commission to acquire by lease the property of the Alton & Eastern, the St. Louis & Alton and the O'Fallon Freight Line of the East St. Louis & Suburban.

INTERNATIONAL RAILWAYS OF CENTRAL AMERICA.—*Annual Report.*—The 1929 annual report of this company shows net income after interest and other charges of $2,409,504, as compared with net income in 1928 of $2,314,135. Selected items from the income statement follow:

	1929	1928	Increase or decrease
Average Mileage operated	719.44	692.77	+ 26.67
RAILWAY OPERATING REVENUES	7,850,085	7,758,080	+ 92,006
Maintenance of way	1,149,100	1,061,350	+ 87,750
Maintenance of Equipment	941,649	1,008,795	— 67,146
Transportation	1,761,607	1,940,795	—179,189

	1929	1928	Increase or decrease
Net Operating Expenses	4,569,746	4,664,340	— 94,594
Net Revenue from Operations	3,280,340	3,093,740	+186,600
Railway tax accruals	232,346	296,229	— 63,883
Railway operating income	3,047,362	2,782,287	+265,075
Hire of freight cars —Cr.	9,916	8,447	+ 1,469
Total Operating Income	3,378,866	3,068,263	+310,603
Non-operating income	301,654	316,048	— 14,394
Gross Income	3,680,520	3,384,311	+296,209
Interest on funded debt	1,150,219	951,915	+198,303
Total Deductions from Gross Income	1,271,016	1,070,176	+200,840
Net Income	2,409,504	2,314,135	+ 95,369
Disposition of net income:			
Income Applied to Sinking Funds	117,529	111,256	+ 6,272
Dividend Appropriations of Income	500,000	500,000	.....

Long Island.—*Abandonment.*—The Interstate Commerce Commission has re-opened for further argument on July 10 the case in which it recently authorized the abandonment of this company's Whitestone branch, in New York City. The case was re-opened at the request of the New York Transit Commission.

Missouri Pacific.—*Stock Issue.*—Examiner A. C. Devoe of the Interstate Commerce Commission has submitted a proposed report recommending that the commission authorize the issuance of $34,700,000 of common stock, the stock or its proceeds to be used in paying dividends on the preferred stock. The accumulated 5 per cent dividends on January 30 amounted to $48.25 a share, or a total of $34,643,548. The company had applied for authority to issue $38,659,900 of common stock, to reimburse the treasury in part for capital expenditures, but the examiner recommends that the smaller amount be authorized only on condition that the company be required to expend subsequent to June 30, 1929, for capital purposes, not less than $6,646,195, in approximately equal annual amounts over a period of not more than five years, and that no part of those expenditures be used as a basis for further capitalization. This is on the ground that the capital expenditures that may be accepted as a proper basis for capitalization amount to only $28,053,805 after deducting $17,108,080 for accrued depreciation reserve. The examiner also recommends conditions requiring that the company shall not, without first procuring the commission's authorization, dispose of its holdings in various subsidiary companies or its interest in advances to certain subsidiaries.

New York Central.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon the operation of the Sunday Creek in Perry County, Ohio. An accompanying order also authorized the Sunday Creek Railway Company to abandon the line.

Pennsylvania.—*Lease of the West Jersey & Seashore.*—This company has been authorized by the Interstate Commerce Commission to acquire by lease the property of the West Jersey & Seashore Railroad Company, the term of the lease to be 999 years from July 1, 1930.

Pennsylvania. — *Trackage Rights.*—This company has been authorized by the Interstate Commerce Commission to operate under trackage rights over the tracks of the Cleveland, Cincinnati, Chicago & St. Louis between Vance and Gridley, Ind., 17.14 Miles.

Pere Marquette.—*Trackage Rights.*—The Interstate Commerce Commission has authorized this company to operate under trackage rights over the line of the Erie between Suspension Bridge and East Buffalo, N. Y., 23 miles.

Rahway Valley Line.—*Acquisition.*—This company has been authorized by the Interstate Commerce Commission to acquire a 3.7-mile line extending from a connection with its own line in Union, N. J., to Boyden avenue and Harding street, Maplewood. Accompanying orders authorized the lease by the Rahway Valley Railway Company of the foregoing line to be acquired by the Rahway Valley Line and permit the Rahway Valley Line to issue two bonds, one for $14,000 and one for $35,000 in connection with the acquisition.

Seaboard Air Line.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $3,510,000 of first lien 5 per cent equipment trust certificates, $1,081,000 of second lien 5½ per cent certificates, and $86,000 of second lien 5 per cent certificates, to be used in the purchase of equipment to the amount of $4,681,957. It is proposed to sell the first lien certificates to Freeman & Co., and Edward Lowber Stokes & Co., at 96.32, while the second lien certificates will be taken by the builders. The company proposes to pay $222,697 in cash.

Southern. — *Bonds. — The Interstate* Commerce Commission has authorized an issue of $3,106,000 of first consolidated mortgage 5 per cent bonds, to be sold at not less than 108 and interest, and the proceeds to be used to retire an equal amount of underlying bonds due July 1.

Southern Pacific.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire and operate the Valley & Siletz, which has a line from Independence to Valsetz, Ore., 40.6 miles.

Wheeling & Lake Erie.—*Hearing on Acquisition Applications Postponed.*—The Interstate Commerce Commission has postponed from June 9 to June 16 the hearing on the applications filed by the Wabash and Pittsburgh & West Virginia for authority to acquire control of the Wheeling & Lake Erie. The Nickel Plate application has been withdrawn. C. F. Taplin, general counsel of the P. & W. V., addressed a letter to the commission protesting against what he termed as "clearly the combined efforts of the Wheeling, the Nickel Plate and the Wabash to prevent our Wheeling control application from coming on for hearing, in the hope that something will transpire, if not already in the making, that will result in the joint benefit of the Nickel Plate and Wabash." The Wabash replied to this by telegram saying that Mr. Taplin was in error in stating that it was in any respect acting in concert with the Nickel Plate interests.

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates as follows:

New Orleans, Texas & Mexico	$7,655,000	1914
St. Louis, Brownsville & Mexico	13,500,000	1914
New Iberia & Northern	816,025	1914
Orange & Northwestern	842,550	1914
Beaumont, Sour Lake & Western	2,287,474	1914
San Benito & Rio Grande Valley	661,100	1914
Houston & Brazos Valley	662,000	1914
Brownsville & Matamoros Bridge Co.	113,000	1914
Union Stock Yards Co. of Omaha (Ltd.)	1,477,155	1919
Richmond, Fredericksburg & Potomac	11,784,320	1916
Washington Southern	7,429,680	1916

Dividends Declared

Erie & Pittsburgh.—$.87½, quarterly, payable June 10 to holders of record May 31.

Lehigh Valley.—Common, $.87½, quarterly; Preferred, $1.25, both payable July 1 to holders of record June 14.

St. Louis, Rocky Mountain & Pacific.—Common, $.50, quarterly; Preferred, $1.25, both payable June 30 to holders of record June 16.

Wheeling & Lake Erie.—Prior Lien, 7 per cent, payable June 14 to holders of record June 11 to June 14.

Average Prices of Stocks and of Bonds

	June 10	Last week	Last year
Average price of 20 representative railway stocks.	122.66	126.43	134.37
Average price of 20 representative railway bonds..	91.83	93.76	90.33

The American Warehousemen's Association has filed with the Interstate Commerce Commission a complaint against the Inland Waterways Corporation objecting to the practice of the federal barge line in establishing rates which include the privilege of free storage in transit on the ground that it deprives the privately-owned warehouses of business.

The Canadian National, which has been granted an application of the Regina (Sask.) Board of Trade for the first special train over the Hudson Bay Railway to Churchill, Man., has set the date for beginning the operation of the road as September, 1931, a year later than had been planned. The Board of Trade had originally asked that the train leave Regina on September 6, 1930.

Large Diameter Cast Iron Pipe.—A 24-page book has recently been issued by the United States Pipe & Foundry Company, Burlington, N. J., which is devoted to construction views and short descriptions of installations of large diameter cast iron pipe in several large cities in this country. The book is bound attractively.

Railway Officers

Executive

E. E. Bashford has been elected vice-president and assistant treasurer of the National of Mexico, with headquarters at New York.

Financial, Legal and Accounting

G. B. Perkins, general auditor of the St. Louis-San Francisco, has been promoted to assistant comptroller. **C. B. Rex,** assistant to the comptroller in charge of personnel, has been promoted to general auditor succeeding Mr. Perkins. **O. S. Jones** has been appointed assistant auditor of revenues and all will have headquarters at St. Louis, Mo.

Howard F. Fritch, passenger traffic manager of the Boston & Maine, with headquarters at Boston, Mass., has been appointed director of budgets, with the same headquarters. This is a new position, created by the B. & M. to establish a system of closer control of expenditures on the road. Mr. Fritch will work

Howard F. Fritch

under the vice-president in charge of finance to co-ordinate and check departmental estimates and projects. Mr. Fritch was born at Livingston, N. J., in September, 1888. He was graduated from Worcester Polytechnic Institute in 1910 and in the same year entered the service of the Eastern Massachusetts Street Railway Company. He was subsequently appointed head of the schedule department of that road and later served consecutively with the same company as statistician, superintendent of traffic, and assistant general manager. Mr. Fritch entered the service of the Boston & Maine in October, 1924, as assistant to the chairman of the executive committee. He was appointed passenger traffic manager of the road in August, 1926, the position he held at the time of his recent appointment.

Traffic

V. M. Ousey has been appointed general agent of the freight department of the New York Central Lines at Jacksonville, Fla.

George T. Fergus, livestock agent for the Missouri Pacific at Wichita, Kan., has been promoted to assistant general livestock agent of the Missouri Pacific Lines, with headquarters at Kansas City, Mo., a newly created position.

George B. Ecker has been appointed general passenger agent of the Atlantic Coast Line, with headquarters at Jacksonville, Fla., and **W. D. Stark** will succeed him as assistant general passenger agent at Miami, Fla.

William J. Craig, passenger traffic manager of the Atlantic Coast Line, with headquarters at Wilmington, N. C., retired effective June 1, after 51 years of continuous railroad service. Mr. Craig was born in Augusta, Ga., and in 1879 he entered railway service as a clerk in the traffic department of the Port Royal (now the Charleston & Western Carolina). He was first promoted to chief clerk and then to freight agent at New York, returning to Augusta in a few months to accept a position as traveling freight and passenger agent. When the property was taken over by the Central of Georgia he was promoted to general freight and passenger agent. In 1891, the Central of Georgia and its subsidiary properties were leased by the Richmond & Danville and Mr. Craig was transferred to Columbus, Ga., in charge of all traffic for the western district of that line. Sometime later he returned to Augusta as general freight and passenger agent of the Charleston & Western Carolina, which, in 1895, was purchased by the Atlantic Coast Line. In 1902 the Atlantic Coast Line purchased the Plant System, whereupon Mr. Craig was promoted to general passenger agent of the enlarged system, with headquarters at Wilmington. In 1906, he was advanced to passenger traffic manager and has held that position since, with the exception of two years, beginning March 1, 1918, when he was called to war duty, to serve as chairman of the Southern Passenger Traffic committee, at Atlanta, Ga.

Operating

O. W. Page, trainmaster on the Kansas City division of the Atchison, Topeka & Santa Fe at Argentine, Kan., has been promoted to superintendent of that division, with headquarters at Kansas City, Mo., succeeding **C. W. Nelson,** deceased.

The jurisdiction of **W. F. Kirk,** general superintendent of the Western district of the Missouri Pacific at Kansas City, Mo., has been extended to include the Central division, heretofore a part of the Southern district. The jurisdiction of **Phillip Carroll,** superintendent of the Southern Kansas division at Coffeyville, Kan., has been extended to include the Central division, and **H. P. Galbreath,** heretofore superintendent of the latter division, has been appointed assistant superintendent of the Central division, with headquarters as before at Van Buren, Ark. **J. W. Daniels,** superintendent of the White River division at Aurora, Mo., has been assigned to agricultural development work and the jurisdiction of **W. Wicker,** superintendent of the Joplin division, has been extended to include the White River division. **S. F. Ayler** has been appointed general yardmaster of the Kansas City Terminal division, **George W. Booker** has been appointed general yardmaster of Carondelet yard, and **W. L. Yowell** has been appointed general yardmaster of the Twenty-third Street yard, and the positions of trainmaster formerly held by each have been abolished. **F. A. Roberson** has been appointed train master of the Missouri division at Poplar Bluff, Mo. **E. E. Buckminster** has been appointed trainmaster of the Central division at Van Buren, succeeding **R. L. Hardgrave,** who has been transferred to the Southern Kansas division at Coffeyville. **J. J. Watson** has been appointed trainmaster of the Wagoner district of the Central division at Van Buren and his former trainmastership at Council Grove, Kan., has been abolished. **G. T. Lewis** has been appointed trainmaster of the Joplin and White River divisions at Nevada, Mo. **E. L. Kimmel,** assistant superintendent of the Missouri-Illinois at Sparta, Ill., has been appointed trainmaster of the Illinois division of the Missouri Pacific at Bush, Ill., succeeding **G. W. Raney,** who has been transferred to the Central Kansas division at Hoisington, Kan. The jurisdiction of **Richard Doyle,** assistant superintendent of the Missouri-Illinois at Sparta, has been extended to include that entire railroad.

Engineering, Maintenance of Way and Signaling

A. J. Patterson, supervisor of signals of the Hocking Valley at Columbus, Ohio, has been appointed signal engineer of the engineering advisory committee of the Chesapeake & Ohio, the Erie, the New York, Chicago & St. Louis and the Pere Marquette at Cleveland, Ohio.

R. M. Smith, assistant engineer maintenance of way of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed division engineer of the Southern Kansas and Central divisions at Coffeyville, Kan., and the position of assistant engineer maintenance of way has been abolished. **W. F. Murray** has been appointed assistant division engineer of the Central division at Van Buren, Ark.

W. H. Stedje, resident engineer of the Twin City Terminal and the Duluth-Superior divisions of the Minneapolis, St. Paul & Sault Ste. Marie and the Duluth, South Shore & Atlantic at Minneapolis, Minn., has been trans-

ferred to the Fond du Lac, Stevens Point and Gladstone divisions, with headquarters at the same point. **E. E. Foster,** division engineer of the Stevens Point division at Stevens Point, Wis., has been promoted to resident engineer with the jurisdiction formerly exercised by Mr. Stedje at Minneapolis. **S. P. Berg,** division engineer of the Twin City Terminal division at Minneapolis, has been transferred to the Stevens Point division to succeed Mr. Foster. **W. M. Olds,** assistant engineer at Fond du Lac, Wis., has been transferred to Enderlin, N. D., succeeding **R. E. Sherer,** who has been promoted to division engineer of the Twin City Terminal division to replace Mr. Berg.

Mechanical

E. F. Stroeh, mechanical superintendent of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed master mechanic of the Missouri and Illinois divisions at Poplar Bluff, Mo., and the position of mechanical superintendent has been abolished. **G. T. Callender** has been appointed master mechanic of the Joplin and White River divisions at Nevada, Mo.

Obituary

John F. Dignan, superintendent of the Wisconsin division of the Illinois Central, with headquarters at Freeport, Ill., died in that city on June 9.

Fred E. Trautman, special press representative of the Canadian Pacific at Winnipeg, Man., died in that city on June 5 following an operation.

Ray L. DePew, special traffic representative of the Mobile & Ohio at St. Louis, Mo., died in that city on June 2 of apoplexy. Mr. DePew was assistant general freight agent of the Mobile & Ohio at St. Louis until September, 1929. He had been connected with that railroad for 43 years.

Judge H. M. Garwood, of the law firm of Baker, Botts, Parker & Garwood, Houston, Tex., general counsel for the Texas and Louisiana lines of the Southern Pacific, died in that city on May 15. Judge Garwood had been engaged in legal work for the Southern Pacific for 25 years.

C. W. Nelson, superintendent of the Kansas City division of the Atchison, Topeka & Santa Fe, with headquarters at Kansas City, Mo., died in that city on June 4. A sketch of Mr. Nelson's railway career together with a reproduction of his photograph appeared in *Railway Age* of February 8, page 414, at the time of his promotion to superintendent of the Kansas City division.

Eugene S. McCarty, former general manager, vice-president and president of a number of small roads that now form part of the St. Louis-San Francisco, died at St. Louis, Mo., on June 6, at the age of 72 years. Mr. McCarty was a native of Albany, N. Y. He entered railway service in 1877 and for twelve years was successively a brakeman and a conductor on the Delaware & Hudson and a conductor on the New York, West Shore & Buffalo (now part of the New York Central), the Kentucky Central (now part of the Louisville & Nashville), and the Chicago & Alton. From 1889 to 1900, he was successively superintendent and vice-president of the St. Louis, Kennett & Southern, general manager of the St. Louis, Cape Girardeau & Ft. Smith at Cape Girardeau, Mo., and president and general manager of the St. Louis & Memphis at New Madrid, Mo. More recently he had engaged in railway contracting.

Albert L. Mohler, former president of the Union Pacific and the Oregon Short line and who was also prominently identified with a number of other western railroads during his 48 years of railway service, died at St. Anthony's hospital, Chicago, on June 6. Mr. Mohler, who was 80 years of age, suffered from a heart attack two weeks previously while enroute from his home in New York to Hayward, Wis. He was born at Ephrata, Pa., and, entering railway service in 1868, he occupied various positions on middle western roads for the following 20 years. They included warehouse and office clerk on the Chicago & North Western at Galt, Ill., station agent on the Rockford, Rock Island & St. Louis (now part of the Chicago, Burlington & Quincy) at Erie, Ill., traveling auditor, pioneer agent, assistant general freight agent and general freight agent of the Burlington, Cedar Rapids & Minnesota (now part of the Chicago, Rock Island & Pacific), and general freight agent and land commissioner of the St. Paul, Minneapolis

Albert L. Mohler

& Manitoba (now the Great Northern). In 1888 he was promoted to general manager of the latter road, later being further promoted to assistant general manager and general manager. He also served as general manager of the Montana Central (now part of the Great Northern). From 1894 to 1897 Mr. Mohler was general manager of the Minneapolis & St. Louis, then being elected president and general manager of the Oregon Railroad & Navigation Company (now the Oregon-Washington Railroad & Navigation Company). In 1904 he became general manager of the Union Pacific and in the following year was also elected vice-president. On October 1, 1911, he was elected president of the Union Pacific and the Oregon Short Line, a position he held until his retirement from active service on July 1, 1916. For a number of years after his retirement, which was occasioned by ill health, Mr. Mohler continued to be identified with the Union Pacific companies in an advisory capacity.

Archibald Fries, vice-president in charge of traffic and commercial development of the Baltimore & Ohio, with headquarters at Baltimore, Md., died suddenly on June 9, at his home in Severna Park, Md. Mr. Fries had been in the service of the Baltimore & Ohio for almost fifty years. He was first

Archibald Fries

employed by that road in 1880 as entry clerk in the general freight office at Cincinnati, Ohio. In January, 1886, Mr. Fries was advanced to the position of chief rate clerk, being further promoted to freight and claim clerk of the Continental Line in January, 1890. Two years later he was appointed to the chief clerkship at Cincinnati and in 1898 he became general agent. The following year, Mr. Fries was promoted to the position of assistant general freight agent, continuing in that capacity until June, 1913, when he was transferred to Pittsburgh as assistant general freight agent. Three years later he became freight traffic manager at that point. In 1918, Mr. Fries was appointed traffic manager of the Allegheny region, under the railroad administration, continuing two years later as general traffic manager of the B. & O. lines. At the end of federal control in 1920, Mr. Fries was appointed vice-president in charge of traffic and commercial development, the position he held at the time of his death. During the time Mr. Fries served in this capacity he was instrumental in making many improvements for the benefit of shippers and the traveling public on the B. & O. lines.

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What Constitutes an Opportunity?

ON every hand we hear among the supply men such comments as these: "What do you think of the convention?"—"Neither Sullivan nor Fredericks of the L. M. & Q. are going to be here"—"The N. S. & B. is only sending one man"—"The railroad managements have ordered reductions in expenditures"—"The number of railroad representatives at the convention will be small." What of it? Assume it is true. We know the railroads will be represented, and any change is an opportunity for the man who is on his toes. If there are fewer representatives from each railroad, the exhibitor will have an opportunity to concentrate his efforts on the most vital problems and present intensively, rather than extensively, his contribution toward efficient railroad operation. True, the educational advantages offered by the exhibits may in part be lost because of a smaller number of railroad observers, but it should not be difficult to determine what the vital issues are. When the market is at the bottom is no time to be depressed or complacent!

The P. & S. Committees

THE work of the Purchases and Stores Division this year is represented by 20 active committee reports, a contest for the younger purchases and stores men, and by special papers. Three of the reports, one on handling supplies for motor coach operations, another on carload shipping, and another on waste avoidance, are subjects being handled by the Division for the first time and represent much work on the part of the committee members. Of the reports on standing subjects, the work of the Committees on Developing Stock Reports, on Reclamation, and Shop Manufacture and Commissary Work are particularly comprehensive, the reclamation report being distinguished by the inclusion of a complete list of practices followed by the different roads. In addition, an interesting report is being presented this year by a joint committee of the Mechanical and Purchases and Stores Divisions on Reclamation. It is interesting to note that approximately 200 officers and employees of purchasing and stores departments were engaged in the committee work during the year, including several new chairmen and 32 new members, while the personnel represents participation in the committee work of the association by 61 Class 1 railroads. The Pennsylvania leads the list of these railroads with 17 members on committees, while the Chicago, Milwaukee, St. Paul & Pacific, the Illinois Central, the Southern Pacific, Pacific System and the Union Pacific Systems are represented on the committees with 10 members each.

Excessive Entertaining Not Good Business

BY this time the many companies exhibiting at the A. R. A. conventions have made their appropriations for entertainment, and as usual have found the sum not the smallest item to be included in the cost of demonstrating their products. The fact that Atlantic City is "the playground of the world" adds, perhaps, certain complications to the problem of mixing pleasure with business. It can be said, however, that the matter of entertainment at these conventions is no worse than at many others.

Instances can be recalled where those in responsible positions were entertained so lavishly that they failed to keep appointments with exhibitors to see demonstrations of new equipment and to discuss business matters of importance to both. The exhibition of appliances, machine tools and shop equipment, such as that being held here, is a business matter of importance to exhibitors and railroad men alike. It affords a real opportunity for intensive study of the latest developments—and it only occurs once every two years. Even if a man attends the conventions at his own expense he owes it to himself, if not to his railroad, to utilize at least a portion of his time in securing information of value to his company and to himself. Exhibitors who indulge in or authorize excessive entertainment are not only wasting money, but are also injuring the chances of securing a full return on their investment in the exhibit.

A New Environment

AFTER the exhibitions held, first, in connection with the Master Car Builders' and American Railway Master Mechanics' Associations and, more recently, with the Mechanical, Purchases and Stores and Motor Transport Divisions of the American Railway Association, have known but one home for a period of twenty-three years, a change of domicile becomes a matter of universal interest. The friendliness of familiar sur-

roundings is missed, and time is required before the family finds itself completely at home in the new environment.

The first impression of the visitor to the exhibit and meeting rooms in the new Municipal Auditorium is the absence of a certain holiday atmosphere which has always been a very tangible characteristic of the exhibits and the Mechanical Division meeting hall on Young's Million Dollar Pier. After all, however, the railroad men and exhibitors alike are here with a serious business purpose, and the business-like character of the facilities and arrangements in the Municipal Auditorium are entirely in keeping with this purpose. The compact arrangement of the exhibition floor space—of much greater area than that available on the pier—in the upper and lower exhibition halls offers advantages to the observer who wishes to study the exhibit systematically not afforded by the extended and irregular arrangement of the various portions of the exhibition space on the pier, supplemented in recent years by annexes more or less remotely connected with the pier. And the attractive lounge facilities on each exhibition floor will meet with the approval of the railroad men, the ladies and the exhibitors alike.

Those who have been familiar with the confusion incidental to the assembling and placing of exhibits on the pier during the last day or two preceding the formal opening of these exhibits will have remarked the orderliness and lack of confusion during this critical period of operations this year. This is a tribute alike to the splendid facilities provided by the Municipal Auditorium, the planning of the Exhibit Committee of the Railway Supply Manufacturers' Association, and the readiness with which the representatives of the exhibiting companies adjust themselves to new situations.

Purchases and Stores Division

THE Purchases and Stores meeting that opens in Atlantic City this morning is the sixth convention since the association became a branch of the American Railway Association, and the 26th since the formation of its predecessor, the Railway Storekeeping Association. It is thus a young association. There were few clearly defined departments of Purchases and Stores on railroads 25 years ago, and many of the founders of the present association are still active in the work. The problems that led to the establishment of the Association, moreover, are of recent origin and present significance, and the urge within the Association to look back in satisfied reminiscence upon its progress is not so strong but what it can look forward upon new and better work to be done.

The vitality of the Purchases and Stores Division is equally apparent. It has been demonstrated in the supply work carried on by the large carriers. Division VI, moreover, is a voluntary association. No one is under compulsion to participate in the committee work. No one is under compulsion to attend its annual meetings, and participate in its discussions, and no one is compelled to follow its recommendations. There is nothing, so far as we have been able to find, that is mandatory in the work of the Association. The size of the supervisory staffs from which the Association can draw its membership, moreover, is limited. Yet, each year has seen the committee work receive good support; each year sees the programs revised to eliminate hackneyed subjects; each meeting is well attended by people who must travel long distances to be present, and the vigor and the volume of the discussions at these conventions is outstanding. There will be papers presented at the meeting this year by authors who by reason of their high position and heavy responsibilities on the railroads they serve could readily excuse themselves from their assignments if it were not for an interest in the work that typifies the entire Association.

A Word About Business

THE whirligig of time brings many and rapid changes. If the conventions had occurred last June they would have been held when business was booming, when the stock market was recording the highest prices in history and going higher every day, and when a majority of business men, including even our greatest financial leaders, believed that the nation was going to enjoy a long continuance of prosperity. It happens that the conventions are being held this year, however, when business is depressed and stock market prices are almost as low as last November and still declining. This contrast might suggest a very interesting question as to how much even the ablest business men really know about general business. Why were so many so optimistic a year ago when prosperity had lasted so long and the stock market was enormously inflated, and why are they so pessimistic now when business has been poor for months and the stock market is as deflated as a flat tire?

Why does it not occur to more people that the time to expect poor business is when business has been good a long time, and the time to expect good business is when business has been poor a long time? However long the present depression may last, it is certain that good times will come again. We venture to tell once more our favorite story illustrating changes in business. On a rainy day a lady said to a sea captain, "Captain, do you think it will stop raining?" "Yes, Madam," he replied, "I think it will. It always has." Poor business is nothing new. We have had it at intervals in both this and other countries throughout the history of modern industry, but it never lasts long in the United States and is always followed by an era of prosperity.

There is just as important work to do when business is poor as when it is good. The most important thing to do when business is poor is to make the improvements in plants and methods which it is more difficult to make when business is good, and which, when business revives, will make the nation more prosperous than ever before. In the meantime let us not get as foolishly pessimistic as many were foolishly optimistic a year ago. Henry Ford a short time ago gave an extremely valuable piece of advice to executives when he said, "If you are too busy, think more." An equally good piece of advice under such conditions as those now existing is, "If you are not busy enough, think more."

"Old Home Week" for the Motor Transport Division

THE Motor Transport Division, which opens its meeting today, is no stranger to Atlantic City. In fact, the announcement of the official designation of the division as Division VIII of the American Railway Association was made by President Aishton at the meeting of the division in Atlantic City two years ago, while the organization had its inception at an informal meeting

of railway officers interested in motor transportation, which was held here in 1926.

Delegates to the meeting of the division may well be proud of the progress which has been made during this four-year interval. It has not been easy progress, and it is consequently all the more commendable. While four years ago there was no railway organization directly and wholly concerned with the changes in transportation methods brought about by the increasing usefulness of motor vehicles, there is now an active Motor Transport Division which numbers among its officers and members many, if not all, of the railway men who, on their own roads, are showing the way in the co-ordination of railway and highway transportation.

The officers and members of the division are to be congratulated on the way in which the division is setting about to accomplish its task. Motor vehicles occupy an important place in the transportation system of the country, and their operation has become an essential part of railroading. To study the possibilities of motor transportation, to determine its economic place in the transportation scheme, and to chart a course for the railways which will lead them as directly as possible to the goal of co-ordinated transportation, is the task which confronts the Motor Transport Division. The successful accomplishment of this task is highly desirable from the standpoint of every railway, and because of this the Motor Transport Division deserves their active support and encouragement.

The present meeting promises to be the best one which the division has ever held, not only from the standpoint of attendance, but also with respect to the constructive nature of the program. Congratulations and best wishes are due the division upon the occasion of the fourth anniversary of its inception and upon its return to its birthplace.

The Programs for Today

THE Mechanical, the Purchases and Stores, and the Motor Transport divisions of the American Railway Association will all hold the opening sessions of their conventions in the Municipal Auditorium today.

Mechanical Division

The eleventh annual meeting of the Mechanical Division will be called to order at 9.30 a. m., daylight saving time, in the meeting room at the right of the stage in the main exhibit hall of the Auditorium. The sessions will adjourn at 12.30 p. m. The program follows:

9.30 a. m.—Meeting Called to Order.
Invocation:
Welcome: Hon. A. M. Ruffu, Jr., Mayor of Atlantic City.
Address by R. H. Aishton, President, American Railway Association.
Address by Chairman G. E. Smart, Chief of Car Equipment, Canadian National Railways.
Action on Minutes of Annual Meeting of 1929.
Appointment of Committees on Subjects, Resolutions, Correspondence, etc.
Unfinished business.
New Business.
Report of General Committee.
Report of Nominating Committee.
Discussion of Report on Lubrication of Cars.

Purchases and Stores Division

The opening session of the eleventh annual meeting of the Purchases and Stores Division will be held in the meeting room at the left of the stage in the main exhibit hall of the Auditorium at 9.00 a. m., daylight saving time, and will adjourn at 1.30 p. m. The program follows:

9.00 a. m. Meeting Called to Order.
Invocation.
Address by C. E. Denney, President, Erie Railroad.
Address by R. H. Aishton, President, American Railway Association.
Communications.
Appointment of Committees (Resolutions and Memorials).
Action on Minutes of 1929 Meeting.
Report of General Committee.
Address by the Chairman, W. Davidson, General Storekeeper, Illinois Central System.
Presentation and Discussion of Reports.
Subject 1—Stores Department Book of Rules.
Subject 2—Classification of Material.
Subject 4—Comparisons of Material Stock Reports and Store Expenses.
Subject 5—Forest Products.
Individual Paper—"The Value of Specialized Railroad Lumber Buying," by A. F. Latta, Lumber Buyer, Canadian Pacific Railway.
Subject 3—Recovery, Repairs and Reclamation of Discarded Material—Classification, Handling and Sale of Scrap.
Joint Committee on Reclamation.
Subject 8—Control of Shop Manufacturing Orders for Stock Materials.

Motor Transport Division

The Motor Transport Division will hold a morning and an afternoon session, meeting in Room 12 of the Municipal Auditorium at 9.30 a. m., daylight saving time, and again at 2.00 in the afternoon.

Committee Room 12, where the Motor Transport division will meet, is adjacent to the gallery above the ball room. To reach the meeting room, walk up the ramps at either side of the registration desks—to the ball room floor, follow the halls to the right to the rear of the ball room, and proceed up the stairway to the gallery hall onto which the meeting room opens. Signs have been placed along the route to show the way.

The program follows:

MORNING SESSION

Report of General Committee—A. P. Russell, Chairman.
Report of Law Committee—R. N. Van Doren, Chairman.

AFTERNOON SESSION

Address by R. H. Aishton, President, American Railway Association.

RAIL-MOTOR CAR SECTION

(E. Wanamaker, Chairman, Rail-Motor Car Section, presiding)
Reports will be presented on the following subjects:
1. The probable rail-motor car equipment of the future.
2. Organization for operating and maintaining rail-motor car equipment.
3. New methods in train heating. (Paper by S. M. Sovocool, Engineer, Peter Smith Heater Co.)
4. Torque control for internal combustion engines. (Paper by A. H. Candee, Railway Engineer, Westinghouse Electric & Manufacturing Company.)

Entertainment

10.30 a. m.—Orchestral Concert, Ball Room. William Klaiss, Feature Pipe Organist. Indoor Golf.
3.30 p. m.—Orchestral Concert, Ball Room, Impromptu Dancing. William Klaiss, Feature Pipe Organist. Indoor Golf.
9.00 p. m.—Informal Dance, Ball Room. William Klaiss, Feaure Pipe Organist. The Four Melody Harmonists.

Members of the Executive Committee of the Railway Supply Manufacturers' Association

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R. S. M. A. Puts on Big Exposition

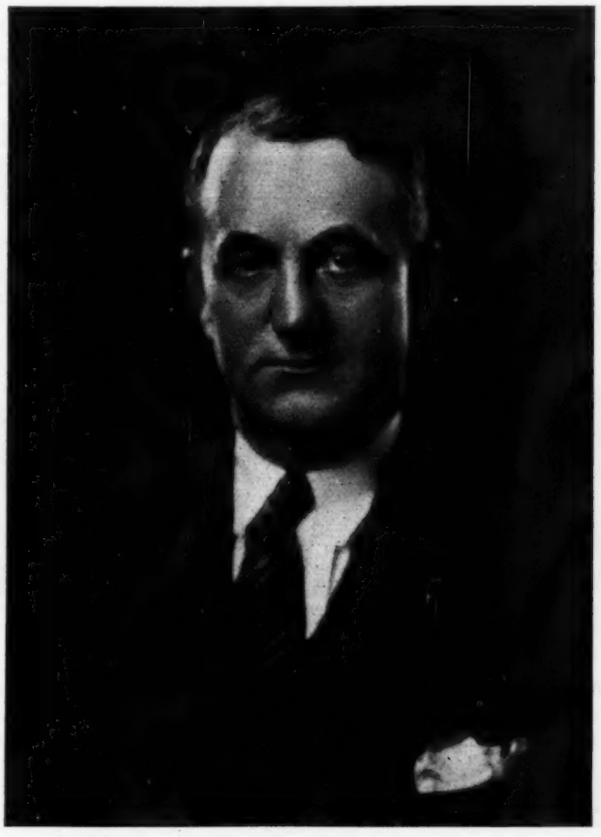
Many difficulties had to be overcome in arranging for the exhibit in the new building

THE Railway Supply Manufacturers' Association is not only charged with the responsibility of arranging for the exhibit at the Atlantic City conventions, but it also relieves the railway associations of many details involved in so great a meeting, or combination of meetings, so that they may give their undivided attention to the technical features of their programs and to studying equipment and facilities developments and progress, as exemplified by the exhibits.

The task of arranging for and housing the exhibit is no small one. It grew steadily in the days when only the Mechanical associations met at Atlantic City, but it has grown still more rapidly since the Purchases and Stores Division, the Motor Transport Division and the Association of Railway Electrical Engineers have scheduled their meetings at Atlantic City during the Mechanical conventions. The problem has not been simplified or made easier by the longer intervals between the exhibits — biennially instead of annually — since our country entered the World War.

The old Steel Pier, where the meetings were first held in Atlantic City, was soon outgrown and the conventions were transferred to Young's Million Dollar Pier. After a few years this, too, proved inadequate and it became necessary to provide annexes for the machine tools and heavier exhibits. This year the new Municipal Auditorium is available for the first time, making it possible for all of the exhibits—except those on the tracks—as well as the meetings of the Mechanical, Purchases and Stores, and Motor Transport Divisions of the American Railway Association to be held under one roof. Our sympathies are with the Exhibit Committee. It undoubtedly had no easy task in making the new space assignments.

In addition to the exhibits, the Railway Supply Manufacturers' Association also has charge of entertainment and recreation features; registration and enrollment, including the publication of the registration booklets; and the supervision of the rolling chairs.



Gilbert E. Ryder
President, Railway Supply Manufacturers' Assn.

The Officers

Gilbert E. Ryder, president of the Railway Supply Manufacturers' Association, has attended the Atlantic City conventions regularly since he entered the railway supply field in 1908. He has served on various committees, working his way up to the chairmanship of some of them, and was elected president of the association in 1928—the culmination of two decades of faithful and efficient service. His engineering training has been evident in the seriousness with which he has approached each assignment and the thoroughness with which he has completed each task.

Paralleling his service in the R.S.M.A. he has also made a similar contribution to the International Railway Supply Men's Association, which is associated with the International Railway Fuel Association; and the Railway Equipment Manufacturers' Association, which is related to the Traveling Engineers' Association. He has served as president of both of these organizations.

Mr. Ryder was born in Minneapolis, Minn., and received his technical training at the University of Wisconsin and the University of Illinois. He served a special apprenticeship with the Chicago, Milwaukee & St. Paul, and was also a machinist and a draftsman for that road. For a time he was assistant mechanical engineer of the Briquette Division of the United States Geological Survey, and later was a deputy inspector for the city of Chicago, leaving that position to become an associate editor of the Railway Review. In 1911 he went with the Superheater Company as a service engineer and is now a vice-president in charge of the sales and service department of that company.

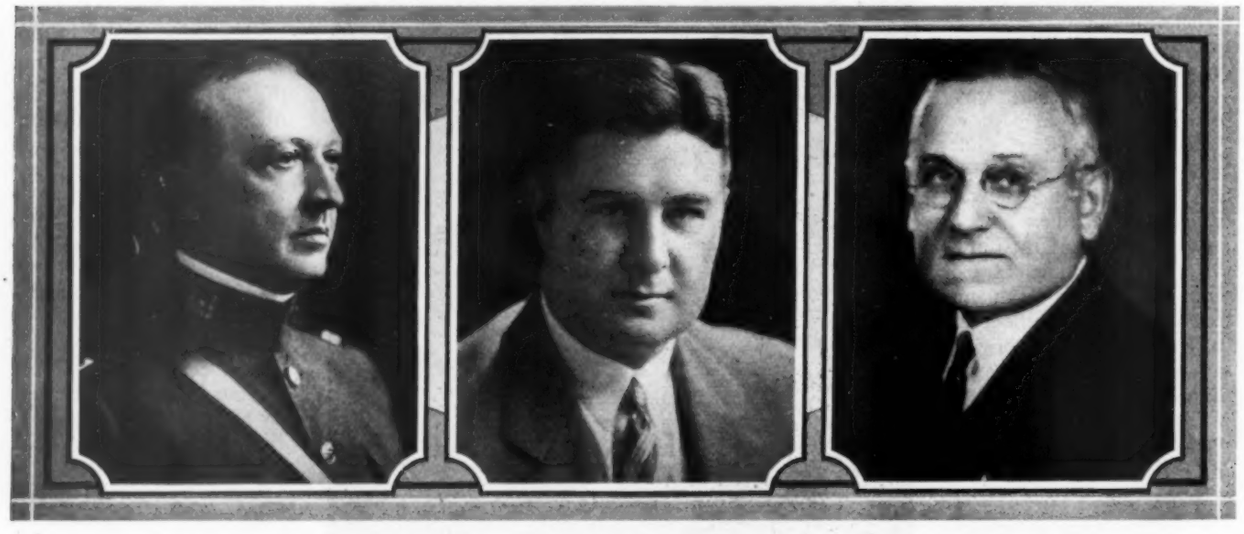
Mr. Ryder has been active in community affairs, serving for several years on the Board of Education of Leonia, N. J., and for three years as its president. He now lives in Larchmont, N. Y. Mr. Ryder is a golf enthusiast. He has two children, a daughter, Mary Evaline, and a son, Charles Gilbert.

Sidney G. Down, vice-president of the R.S.M.A., has

taken an active part in the work of the association for a number of years and was chairman of its Exhibit Committee for the 1928 convention. He is vice-president of the Westinghouse Air Brake Company and for 28 years has been prominently and actively identified with the growth and development of that company and its subsidiaries.

He is also director and vice-president of the Westinghouse Traction Brake Company of Pittsburgh; director and vice-president, National Brake & Electric Company of Milwaukee; director and president, American Brake Company of St. Louis; director and president, Safety Car Devices Company of St. Louis; director and president, Westinghouse Pacific Coast Brake Company, Emeryville, Cal.; director, Westinghouse Air Brake Home Building Company, Wilmerding, Pa.; director and president, Associated Engineering & Supply Company, San Francisco, Cal.; director and vice-president, Bendix-Westinghouse Automotive Air Brake Company, Pittsburgh, Pa.

John D. Conway, the secretary-treasurer of the association, maintains an office in Pittsburgh as the headquarters of the organization. He has held this job so long that only a few of the old-timers remember when he first took it.



Ralph Brown
Chairman, Transportation Committee

George L. Gordon
Chairman, Entertainment Committee

F. E. Dodson
Chairman, Enrollment Committee

Executive Committee

The Executive Committee includes, in addition to the president and vice-president 13 members who are selected from eight geographical districts. The names of the members and the districts which they represent are:

First district (New England states) one member: Victor W. Ellet, Hunt-Spiller Manufacturing Corporation, South Boston, Mass.

Second district (New York and New Jersey) three members: R. J. Himmelright, General Refractories Company and Standard Locomotive Equipment Company, New York; Franklin H. Smith, Gold Car Heating & Lighting Company, Brooklyn, N. Y.; and C. W. Floyd Coffin, Franklin Railway Supply Company, Inc., New York.

Third district (Pennsylvania) two members: Charles H. Gayetty, Boston Woven Hose & Rubber Company, Philadelphia, Pa.; C. J. Nieman, Penn Iron & Steel Company, Creighton, Pa.

Fourth district (Ohio, Indiana and Michigan) two members: W. E. Wine, The Wine Railway Appliance Company, Toledo, Ohio; Walter C. Sanders, The Timken Roller Bearing Company, Canton, Ohio.

Fifth district (Illinois) two members: H. E. Daniels, West Disinfecting Company, Chicago; N. C. Naylor, American Locomotive Company and Railway Steel-Spring Company, Chicago.

Sixth district (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee) one member: D. L. Eubank, Galena Oil Corporation, Atlanta, Ga.

Seventh district (states west of the Mississippi River, including Louisiana, Minnesota and Wisconsin) one member: F. J. O'Brien, Globe Steel Tubes Company, Milwaukee, Wis.

Eighth district (Canada) one member: Holly Armstrong, Montreal Locomotive Works, Ltd., Montreal, Canada.

The terms of four of the members of the Executive Committee expire on September 1, 1930, and their successors will be elected at the annual meeting of the association this week. They are Charles H. Gayetty, third district: W. E. Wine, fourth district; Harry E. Daniels, fifth district, and D. L. Eubank, sixth district. In addition to this it will be necessary to elect a member from the second district to succeed J. E. Brown, resigned. This position has been filled during the past year by C. W. Floyd Coffin by appointment; likewise, in the seventh district, a member must be elected to fill the unexpired term of George L. Davis resigned. This position has been filled during the year by F. J. O'Brien by appointment.

Exhibit Committee

The members of this committee of which D. L. Eubank is chairman are drawn from the Executive Committee and are C. W. Floyd Coffin, R. J. Himmelright, N. C. Taylor and W. E. Wine. The committee has had a particularly difficult task for this particular convention, because of the transfer of the exposition from the Million Dollar Pier to the Municipal Auditorium. On the other hand, it has been relieved of the necessity of finding ways and means of housing the overflow, which

was necessary the last years when the exhibit was held on the Million Dollar Pier. That it has successfully accomplished its work will be indicated by reference to the article elsewhere in this number, giving detailed information about the exhibit.

Enrollment Committee

Here we find a group of hard-working boys, who must keep their "noses pretty much to the grindstone" during the conventions. They have the responsibility of greeting the members and their guests and of seeing that they are properly registered. The committee is also charged with publishing the registration booklet or enrollment lists. Its personnel is as follows:

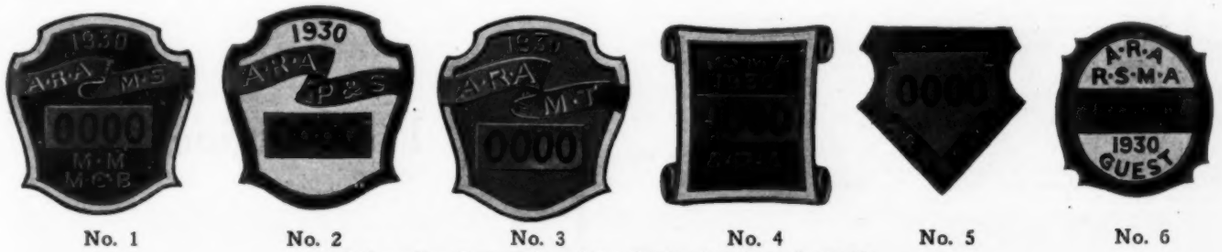
F. E. Dodson, *Chairman*, United States Rubber Co., Baltimore, Md.
H. L. Burrhus, *Vice-Chairman*, Johnson Manufacturing Co., New York.
M. K. Tate, *Vice-Chairman*, Lima Locomotive Works, Lima, Ohio.
G. W. Armstrong, Bethlehem Steel Company, Inc., New York.
G. M. Buchanan, Black & Decker Mfg. Co., Atlantic City, N. J.
G. A. Cardwell, Lukens Steel Co., Coatesville, Pa.
W. H. Dickinson, Railway Purchases & Stores, New York.
A. B. Edge, Detroit Graphite Co., Atlanta, Ga.
G. Gregory, Oakite Products, Inc., Boston, Mass.
F. M. Hartley, Jr., National Lead Co., New York.
C. O. Hedner, Yale & Towne Mfg. Co., Stamford, Conn.
J. F. Jobst, Chicago Pneumatic Tool Co., Chicago, Ill.
F. L. Johnson, Pressed Steel Car Co., Chicago, Ill.
J. E. Leonard, Pittsburgh Plate Glass Co., New York.
P. D. Mallay, Johns-Manville Corp., New York.
C. E. Mitchell, Alexander Milburn Co., Baltimore, Md.
B. T. Moffatt, B. F. Goodrich Rubber Co., New York.
C. A. Otto, Murphy Varnish Co., Newark, N. J.
P. E. Raymond, Wm. Sellers & Co., Inc., Chicago, Ill.
Alexander Smith, MacRae's Blue Book, New York.
A. D. Stuver, Gold Car Heating & Lighting Co., Chicago, Ill.
R. E. Thayer, *Railway Age*, New York.
J. A. Wahlgren, United States Rubber Co., New York.
B. J. Wilson, Pocket List of Railroad Officials, Chicago, Ill.

Entertainment Committee

The task of providing entertainment and recreation for the conventions has grown in proportion to the number of conventions meeting at the same time and the size of the attendance. It was a comparatively simple task in the old days when only the Mechanical associations met at Atlantic City. It is not as easy, however, to look after the great crowd today. The committees, however, have measured up to the task which has been assigned to them and this year promise to surpass, if possible, the performance of former committees. The experiment of arranging for indoor and outdoor bathing worked out so well two years ago that the committee is continuing to be responsible for this feature.

The names of the members of the committee are:

G. L. Gordon, *Chairman*, Lukens Steel Co., Coatesville, Pa.
G. W. Denyven, *Vice-Chairman*, A. M. Castle & Co., San Francisco, Calif.
J. E. Brown, *Vice-Chairman*, Central Valve Mfg. Co., Chicago, Ill.
J. H. Ainsworth, A. M. Byers Co., Pittsburgh, Pa.
H. M. Arrick, American Rolling Mill Co., Middletown, Ohio.
H. G. Barbee, Chicago Pneumatic Tool Co., New York.
W. L. Bayer, Canadian Bronze Co., Montreal, Quebec.
A. E. Biddle, Union Railway Equipment Co., Chicago, Ill.
J. P. Bourke, Ewald Iron Co., New York.
J. D. Brandon, American Arch Co., Inc., Chicago, Ill.
Bard Browne, The Superheater Co., New York.
C. E. Bryant, Jr., Johns-Manville Corp., New York.
L. T. Burwell, Q. & C. Co., New York.
C. R. Busch, Buffalo Brake Beam Co., New York.
R. A. Cannon, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
R. A. Carr, Locomotive Firebox Co., Chicago, Ill.
G. B. Christian, Wine Railway Appliance Co., Washington, D. C.
J. W. Coleman, Consolidated Equipment Co., Ltd., Montreal, Quebec.
W. E. Corrigan, American Locomotive Co., Cleveland, Ohio.
J. G. Cottle, Reading Iron Co., Chicago, Ill.
H. M. Clymer, Wrought Iron Co. of America, Lebanon, Pa.
L. A. Carpenter, Tousey Varnish Co., Chicago, Ill.
E. C. Daniels, West Disinfecting Co., Chicago, Ill.
S. S. Demarest, Detroit Graphite Co., Forest Hills, L. I., New York.
L. N. DeVoe, Irving Iron Works Co., Long Island City, N. Y.
H. W. Dillon, Gold Car Heating & Lighting Co., Brooklyn, N. Y.
H. J. Downes, American Locomotive Co., New York.
L. F. Duffy, Chicago Pneumatic Tool Co., Chicago, Ill.
D. S. Ellis, Worthington Pump & Machinery Corp., Harrison, N. J.
H. V. Eisele, Canadian Steel-Tire & Wheel Co., Montreal, Quebec.
H. O. Fettinger, Ashton Valve Co., New York.
H. A. Flynn, New York Air Brake Co., Brookline, Mass.
J. W. Fogg, MacLean-Fogg Lock Nut Co., Chicago, Ill.
R. E. Frame, Standard Car Truck Co., Chicago, Ill.
G. H. Gordon, Dominion Foundries & Steel, Ltd., Hamilton, Ont.
H. B. Gardner, Westinghouse Air Brake Co., New York.
P. H. Grunnagle, Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
L. C. Haigh, Magor Car Corporation, New York.
C. E. Hale, Baldwin Locomotive Works, Chicago, Ill.
K. M. Hamilton, Bettendorf Co., Chicago, Ill.
C. Hankins, Wine Railway Appliance Co., Washington, D. C.
Ellsworth Haring, Ellsworth Haring Co., New York.
E. M. Harsbarger, SKF Industries, New York.
F. B. Hartman, Hunt-Spiller Mfg. Corp., Atlanta, Ga.
O. C. Hayward, Williams Hayward Co., Chicago, Ill.
W. J. Hedley, General Electric Co., New York.
C. M. Hoffman, Dearborn Chemical Co., Chicago, Ill.
E. C. Hogan, American Brake Shoe & Foundry Co., New York.
J. W. Hulson, Hulson Grate Co., Keokuk, Iowa.
Carroll Jarden, Sherwin-Williams Co., Philadelphia, Pa.
I. H. Jones, Central Alloy Steel Co., Massillon, Ohio.
J. R. Jones, Alan Wood Steel Co., Conshohocken, Pa.
A. G. Johnson, Armspear Mfg. Co., New York.
B. S. Johnson, W. H. Miner & Co., Chicago, Ill.
W. T. Kilborn, Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.
J. C. Kuhns, Burden Iron Co., Chicago, Ill.
R. R. Lally, Globe Steel Tubes Co., New York.
W. T. Lane, Franklin Railway Supply Co., Chicago, Ill.
E. Laterman, Champion Rivet Co., New York.
Henry Linn, Denyven, Linn Co., Boston, Mass.
A. N. Lucas, Oxweld Railroad Service Co., Chicago, Ill.
L. J. McCombs, Patterson-Sargent Co., Boston, Mass.
A. J. McDonald, Lebanon Steel Foundry, Philadelphia, Pa.
C. I. McPherson, J. G. Brill Co., Philadelphia, Pa.
D. T. Main, National Steel Car Corp., Montreal, Quebec.
C. G. Melvin, Griffin Wheel Co., New York.
J. A. Morland, Timken Roller Bearing Co., Canton, Ohio.
W. S. Morris, American Locomotive Co., Chicago, Ill.
L. K. Morrison, Galena Signal Oil Co., Richmond, Va.
M. E. Morrison, Individual Drinking Cup Co., Chicago, Ill.
R. J. Mulholland, Automatic Transportation Co., Buffalo, N. Y.
J. H. Murrian, W. S. Murrian Co., Knoxville, Tenn.
G. M. Myers, Standard Stoker Co., Clarenden, Va.
J. R. New, William Sellers & Co., Atlanta, Ga.



No. 1 No. 2 No. 3 No. 4 No. 5 No. 6

Badges for Convention Attendants—See Key in Table

F. S. Nichols, The Barrett Company, New York.
A. B. Nilsen, F. K. Shults, New York.
B. L. Norton, Scullin Steel Co., New York.
W. C. Newman, General Electric Co., Philadelphia, Pa.
Clifford O'Dell, Superheater Co., Montreal, Quebec.
Thomas O'Leary, Jr., Johns-Manville Co., Chicago, Ill.
R. R. Paradies, Arco Co., Elizabeth, N. J.
R. T. Peabody, Air Reduction Sales Co., New York.
L. R. Pyle, Locomotive Firebox Co., Chicago, Ill.
M. M. Ressel, General Refractories Co., Philadelphia, Pa.
L. B. Rhodes, Vapor Car Heating Co., Washington, D. C.
A. L. Roberts, International Nickel Co., New York.
W. S. Rose, W. L. Brubaker & Bros., New York.
F. O. Schramm, Pressed Steel Car Co., New York.
K. F. Sheeran, Railway Purchases & Stores, Chicago, Ill.
J. C. Shields, Carnegie Steel Co., Pittsburgh, Pa.
W. H. Smaw, Electric Service Supplies Co., Atlanta, Ga.
F. W. Stubbs, A. M. Byers Co., Chicago, Ill.
C. W. Sullivan, Goodyear Tire & Rubber Co., Chicago, Ill.
J. H. Van Moss, American Welding Co., New York.
E. H. Weaver, Westinghouse Air Brake Co., Chicago, Ill.
J. R. Wetherald, W. H. S. Bateman & Co., Philadelphia, Pa.
J. F. Wiese, Lukens Steel Co., Coatesville, Pa.
A. W. Willcuts, Joseph T. Ryerson & Sons, St. Louis, Mo.
F. A. Wirth, Carbo-Oxygen Co., Pittsburgh, Pa.
G. H. Woodroffe, Reading Iron Co., New York.

Transportation Committee

This committee has charge of directing the use of the rolling chairs, which are available to convention attendants without charge for certain specified hours each

day. Convention attendants are urged to co-operate with the committee by wearing their badges at all times and also in reporting promptly to members of the committee if they feel that the service is not all that it should be.

The members of this committee are:

Ralph Brown, *Chairman*, Adams & Westlake Co., Chicago, Ill.
R. R. Porterfield, *Vice-Chairman*, Superheater Co., Chicago, Ill.
S. C. Dinsmore, *Vice-Chairman*, National Refining Co., Chicago, Ill.
J. K. Aimer, Reading Iron Co. of Pa., New York.
H. A. Allen, SKF Industries, Inc., New York.
Wm. Anderson, The Pantasote Co., Inc., Chicago, Ill.
C. C. Bailey, General Electric Co., Schenectady, N. Y.
Jno. Baker, Locomotive Firebox Co., Chicago, Ill.
R. L. Belknap, Gold Car Heating & Light Co., Brooklyn, N. Y.
W. T. Bell, Goodyear Tire & Rubber Co., Akron, O.
S. L. Beymer, Hutchins Car Roofing Co., Detroit, Mich.
C. L. Brown, Consolidated Ashcroft Hancock Co., Inc., Chicago, Ill.
J. M. Brown, The White Co., Chicago, Ill.
W. L. Brown, Industrial Brownhoist Corp., Phila., Pa.
R. B. Buram, Edna Brass Mfg. Co., Cincinnati, O.
W. Rodney Burton, Hynson, Westcott & Dunning, Phila., Pa.
E. R. Campbell, L. C. Chase & Co., Boston, Mass.
D. J. Carmouche, Celotex Company, Chicago, Ill.
Champ Carry, Pullman Car & Mfg. Corp., Chicago, Ill.
C. S. Cingaman, Johns-Manville Corp., New York.
G. E. Coffey, Union Railway Equip. Co., Chicago, Ill.
F. J. Cooledge, Buckeye Steel Castings Co., Chicago, Ill.
C. Cooper, Jr., Clark Cooper, Phila., Pa.
G. E. Cornwall, Heywood-Wakefield Co., Boston, Mass.
C. C. Creighton, Standard Oil Co. of New York, New York.
C. W. Damberg, A. M. Byers Co., New York.
H. F. Deubel, Chicago Pneumatic Tool Co., New York.
L. P. Duggan, Garlock Packing Co., Phila., Pa.
A. W. Fields, James B. Sipe & Co., Pittsburgh, Pa.
E. H. Fisher, Wine Railway Appliance Co., Toledo, O.
E. S. Fitzimmons, Flannery Bolt Co., Pittsburgh, Pa.
W. W. Frazer, Graybar Electric Co., Phila., Pa.
J. A. Galligan, B & M Equip. Co., Chicago, Ill.
G. B. Gengenbach, Hale & Kilburn Co., Chicago, Ill.
H. V. Gigandet, Canadian Railroad Service Co., Ltd., Toronto, Ont., Can.
Chas. F. Gilbert, A. Gilbert & Son Brass Foundry Co., St. Louis, Mo.
H. E. Graham, American Car & Foundry Co., New York.
J. W. Hackett, Okonite Company, New York.
E. H. Hall, Milar Clinch & Co., Chicago, Ill.
H. G. Hansen, Elwell-Parker Electric Co., New York.
A. J. Hawley, Standard Oil Company of New Jersey, New York.
F. C. Heinen, Camel Company, Chicago, Ill.
L. C. Hensel, Gould Storage Battery Co., Inc., New York.
A. H. Hudson, J. G. Brill Co., Upper Montclair, N. J.
J. F. Hutson, National Malleable & Steel Castings Co., Chicago, Ill.
Wm. Jones, Oxweld R. R. Service Co., Chicago, Ill.
J. H. Karow, Alemite Corp., Chicago, Ill.
J. C. Keene, Bradford Corp., Chicago, Ill.
P. R. Keller, General Steel Casting Corp., Granite City, Ill.
C. D. Kester, Westinghouse Electric & Mfg. Co., Phila. Pa.
W. H. Kinney, Dearborn Chemical Co., Chicago, Ill.
Jno. D. Lemley, T-Z Railway Equip. Co., Chicago, Ill.
A. W. Lenderoth, Crosby Steam Gage & Valve Co., New York.
Harry Loeb, Lukens Steel Co., New York.
Samuel Mac Clurkan, American Arch Co., New York.
J. A. MacLean, Jr., MacLean-Fogg Lock Nut Co., Chicago, Ill.
F. V. McGinness, Edison Storage Battery Co., Orange, N. J.
W. B. McCormick, American Car & Foundry Motors Co., St. Louis, Mo.
P. B. McGinnis, Cardwell Westinghouse Co., Chicago, Ill.
F. W. Matheson, Acme Lead & Color Co., Detroit, Mich.
Hunter Michaels, American Locomotive Co., Chicago, Ill.
E. F. Milbank, Detroit Lubricator Co., Chicago, Ill.
R. T. Miner, W. H. Miner, Inc., Chicago, Ill.
D. J. P. Murray, Anchor Packing Co., Baltimore, Md.
W. S. Noble, The Ruberoid Co., New York.
O. F. Olsen, Castle & Company, Chicago, Ill.
C. C. Osterhout, Wrought Iron Co. of America, Rome, N. Y.
M. J. Oswald, Federal Motor Truck Co., New York.
C. L. Otremba, Briggs & Stratton Corp., Milwaukee, Wis.
A. W. Preieschat, National Lock Washer Co., Chicago, Ill.
W. L. Ransom, Graham-White-Sander Corp., Roanoke, Va.
A. C. Reed, Shill Folding Chair Co., Atlantic, N. J.
J. D. Ristine, Arco Company, Chicago, Ill.
P. H. Ryan, Manning, Maxwell & Moore, Inc., New York.
G. A. Secor, Buda Company, Chicago, Ill.
J. H. Sharp, Grip Nut Co., Chicago, Ill.
A. D. F. Simmons, Scully Steel & Iron Co., New York.
J. Y. Sloan, Pullman Car & Mfg. Corp., New York.
Fred Speer, Joseph Dixon Crucible Co., Jersey City, N. J.
L. F. Theurer, Pittsburgh Plate Glass Co., Chicago, Ill.
E. B. Van Patten, Glidden Company, Chicago, Ill.
H. M. Van Sweringen, Chicago Railway Equip. Co., Chicago, Ill.
Herbert J. Watt, Jones & Laughlin Steel Corp., Pittsburgh, Pa.
G. E. Watts, Timken-Detroit Axle Co., Atlanta, Ga.
C. F. Weil, American Brake Shoe & Foundry Co., Chicago, Ill.
J. M. Welles, Globe Steel Tubes Co., Chicago, Ill.
E. E. Whitmore, Adams & Westlake Co., Chicago, Ill.
H. W. Wiley, Hyatt Roller Bearing Co., Newark, N. J.
L. F. Wilson, Bird-Archer Co., Chicago, Ill.
Paul N. Wilson, Timken Roller Bearing Co., Canton, O.
I. O. Wright, Symington Co., Baltimore, Md.

Badge Committee

One does not realize, until he looks into it, the great variety and designs of badges that are necessary to provide for the various enrollment classifications. The Badge Committee has charge of arranging for the design of the badges and seeing that an adequate number is provided. The table which follows will help convention attendants to recognize the classifications of those who wear the different types of badges. The chairman of the committee is Franklin H. Smith and he is assisted by F. J. O'Brien.

No.	Badge for	Description
1	Members of Mechanical Division	Royal blue ground, white outline
2	Members of Purchases and Stores Division	White ground, royal blue outline
3	Members of Motor Transport Division	Peacock blue ground, white outline
3a*	American Railway Association	Royal blue ground, white outline
4	Railway Supply Manufacturers' Association	Royal blue ground, white outline
5	Railroad Ladies	Royal blue ground
5	Supply Ladies	Peacock blue ground
5	Guest Ladies	White ground
6	Guests	White ground, royal blue outline

*Same as 1, 2 and 3, except that it has letters A.R.A. only.

Other Committees

Other important committees which are selected entirely from the Executive Committee are:

By-Laws Committee—This committee is charged with making a study of the rules and by-laws and recommending revisions where changed conditions make them advisable. It consists of H. E. Daniels, chairman, and Charles J. Nieman, vice-chairman.

Hotel Committee—This committee is charged with the task of looking after the interests of convention attendants in cases of misunderstandings or complaints about the hotel accommodations. It keeps in contact with the Hotel Men's Organization at Atlantic City and is always glad to assist in any way that it can in seeing that the guests are properly provided for. Its chairman is V. W. Ellet, and he is assisted by Holly Armstrong, vice-chairman.

Finance Committee—This committee has charge of all matters relating to finance and consists of Charles H. Gayetty, chairman, and Walter C. Sanders, vice-chairman.

Post Office

UNITED STATES mail addressed in care of R. S. M. A., Secretary's Office, Atlantic City Auditorium, Atlantic City, N. J., will be taken care of and distributed to exhibitors' booths. Members are requested not to send general circular matter for distribution to other exhibitors, as this is a violation of the Association Rules.

Bathing

SPECIAL arrangements have been made for bathing from the Convention Hall bath houses directly under the Auditorium, and also at the Ambassador Hotel.

At the Ambassador there is a choice of indoor or surf bathing.

The fees are as follows:

At the Ambassador, including beach and pool, using your own suit, $1.00, or $1.50 using the hotel suits.

At the Convention Hall bath house, courtesy rates of 25c using your own suit and 50c including rental of suit.

The bathing is under the direction of the members of the Bathing Committee, who are all expert swimmers.

Our New Convention Quarters

Fifteen-million-dollar Municipal Auditorium houses all convention features except track exhibit

THE conventions and exhibits, after being held on Young's Million Dollar Pier almost a quarter of a century, are to be held this year in Atlantic City's new auditorium and convention hall, which is one of the largest and most remarkable buildings in the world. Naturally, many of the convention visitors are wondering whether the new building will serve the purpose as well as the pier has, but it seems entirely probable that after actual experience they will decide that the change is an improvement.

The convention hall occupies an entire block of seven acres, and is owned by the municipal government of Atlantic City, which built it at a cost of $15,000,000. The main auditorium is so large that if Babe Ruth had made the best home run hit of his life in it the ball would not have travelled from one end of the room to the other. The main auditorium can seat 41,000 persons, and there is enough other seating capacity in the building for more than 25,000 additional persons. Late in October a football game between Washington and Jefferson College and Lafayette College will be played in the main auditorium, and there will be room enough in it to provide for a gridiron for the game and for the seating of 28,000 spectators. The ballroom on the second floor has a seating capacity for 5,000 persons and a dancing capacity for 2,500.

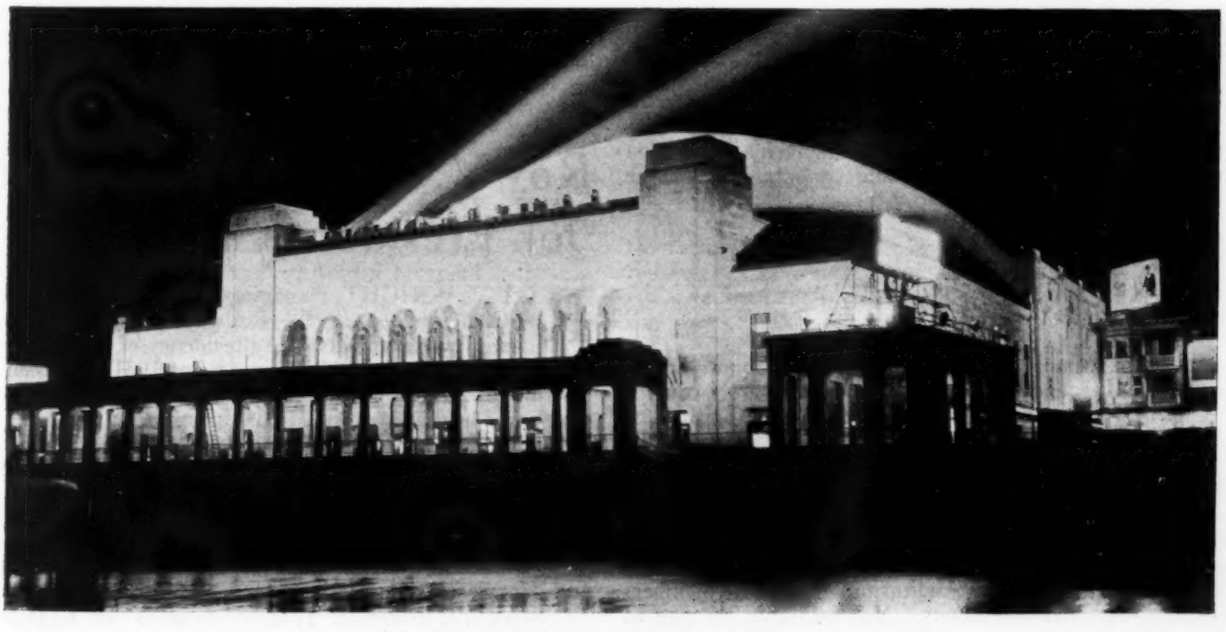
In spite of the great size of the auditorium, it is said that a whisper made at one end of it can be heard in the other end. It is to contain the largest pipe organ in the world, with 32,000 pipes of unprecedented size grouped along the 350 ft. trusses of the vast ceiling. The organ is not yet completed but it is near enough completion to be used, and will be played each day. There is also in the ballroom the largest theatrical pipe organ in the world, an instrument said to be of wonderful quality and power, which will be played each day by Mr. William Klaiss, who has been engaged for the entire convention. The large organ in the main auditorium will cost $350,000.

Perhaps nothing in the auditorium gives a deeper impression of its size than figures regarding the American flag which has been placed on one of the walls. To a person standing on the opposite side of the building the flag does not look extremely large. As a matter of fact, it is 100 ft. long, 60 ft. wide, and the stars in it are a yard wide from point to point.

The entire first floor and a floor below are occupied by the exhibits. The meeting hall of the Mechanical Division is reached by entering the auditorium through the main entrance and proceeding to the corner on the right of the stage. The meeting hall of the Purchases and Stores Division is reached by going to the corner of the building on the left of the stage. The meeting hall of the Motor Transport Division is on an up-stairs floor, but markers are being set up, by following which the visitors can readily find any of the meeting halls.

The main convention has 268,000 sq. ft. of exhibit area and 10,000 sq. ft. additional for separate exhibits. The ballroom, where all the large social events in connection with the conventions will be held, is a very spacious and beautiful room which is reached by ramps from the main entrance. The interesting statement is made that this ballroom is as large as the main concourse in the Grand Central Station in New York.

The building is completely equipped with an amplifying system which makes it possible to broadcast addresses and music as desired.



The Municipal Auditorium at Night

Lost

LOST: Badge No. 7077. Finder please return to L. W. Barber, at the booth of the Standard Car Truck Company.

Early Registration Figures

THE registration up to four o'clock Tuesday afternoon was as follows:

Mechanical, Div. V	157
Purchases and Stores, Div. VI	49
Motor Transport, Div. VIII	15
Railroad ladies	128
Supply ladies	161
Railway supply officers	8
Entertainment Committee	102
Transportation Committee	46
Enrollment Committee	27
Supply men	772
Guests	50
Total	1,515

Taxicabs at Low Rates

THE Transportation Committee has arranged with the Atlantic City Taxicab Company to carry members at low meter rate with no extra charge for extra passengers. Cabs can be identified by a gummed sticker placed on windshield reading as follows:

WELCOME A. R. A.
PAY METER RATES ONLY
NO EXTRAS
Cab No. 101 R. S. M. A.

Transportation Committee.

Buses to the Track Exhibit

STARTING at nine o'clock each morning buses will leave the Auditorium every 15 minutes for the track exhibits at the Pennsylvania (Electric) and Reading stations. They will leave from the doorways at the ocean end of the exhibit hall on the lower floor level. J. M. Brown of the White Company will be in charge, the buses being furnished through the courtesy of that company. The three buses used will leave the above mentioned points—the Auditorium, Pennsylvania (Electric) and Reading stations—at 15-minute intervals during the day.

Golf

THE Atlantic City and the Linwood Country clubs have extended the courtesies of their golf courses to visiting members of the A. R. A. and R. S. M. A. Greens fees must be paid. Courtesy cards must be secured by members either through the management of the prominent hotels or from the Golf Committee at Entertainment Committee headquarters. Regular bus lines operate to both courses.

An indoor golf course has been set up on the Ball Room floor level of the Auditorium for use of members in mornings and afternoons. No one under the age of 16 will be permitted to use this course.

Rolling Chairs

THE Transportation Committee will provide rolling chairs for members and guests wearing official badges, from the following stations, between the hours indicated, from June 18th to June 25th, inclusive:

	A.M.	P.M.
Auditorium	8.30	6.30
Ambassador Hotel	8.30	6.30
Marlborough-Blenheim	8.30	6.30
Traymore	8.30	6.30
Chalfonte Hotel	8.30	6.30
Ritz-Carlton	8.30	6.30
Strand Hotel	8.30	6.30
	P.M.	P.M.
Grand Ball, Evenings only	8.00 to	10.00

Unoccupied chairs may be stopped at any point on the Boardwalk, except between the Marlborough-Blenheim and the Auditorium, and they may be used in either direction.

Convention chairs are not allowed to wait more than 15 minutes. The Transportation Committee will consider it a favor if the members or guests of the Association report to it any inattention on the part of an attendant. Give the number on the chair to facilitate checking the complaint.

Meetings of Railway Supply Manufacturers' Association

TWO meetings of the Executive Committee of the Railway Supply Manufacturers' Association have been scheduled during the conventions and exhibition. The first will be held on Thursday, June 19, at 10:30 A. M. The second will be held on Tuesday, June 24, at 10 A. M. The places of meeting will be announced by bulletin.

The district election meetings are scheduled for Saturday, June 21, between the hours of 10 A. M. and 11:30 A. M., at the office of the secretary-treasurer of the association.

The annual meeting of the association will also be held on Saturday, June 21. The hour and place of this meeting will be announced later by bulletin.

Roy V. Wright Nominated for President, A. S. M. E.

ROY V. WRIGHT, managing editor of the *Railway Age* and editor of the Railway Mechanical Engineer, was nominated for presidency of the American Society of Mechanical Engineers for 1931 at a recent meeting of the Nominating Committee of that society which was held at Detroit, Mich., during its spring meeting. The election will be held by letter ballot of the entire membership which closes September 23, 1930.

Other nominations were as follows: For vice-presidents: William A. Hanley, chief engineer, Eli Lilly Company, Indianapolis, Ind.; Thomas R. Weymouth, president, Oklahoma Natural Gas Corporation, Tulsa, Okla.; and Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J. For managers: W. L. Batt, president, S. K. F. Industries, Inc., New York; H. L.

Doolittle, chief designing engineer, Southern California Edison Company, Los Angeles, Cal.; and H. L. Whittemore, chief, Engineering Mechanics Section, Bureau of Standards, Washington, D. C.

Mr. Wright has been active in the work of the American Society of Mechanical Engineers for many years. He was a member of the Railroad Committee, which was the predecessor of the present Railroad Division, and was a member of the first Metropolitan Section Committee. From 1921 to 1923, inclusive, he served as chairman of the Meetings and Program Committee, and is at present a member of the Committee of Awards and the Biography Advisory Committee.

He served a three-year term as manager, 1924 to 1926, inclusive, and was afterwards elected to serve a two-year term as vice-president, during 1927 and 1928. He served as president of the United Engineering Societies, 1928-1929.

Mr. Wright was one of the honorary editors of the Fifty-Year Progress Reports which were published by the A. S. M. E. in connection with its recent semi-annual celebration. He is the author of the section on Transportation in the book "Toward Civilization", a companion volume to "Whither Mankind".

Motor Coach Equipment Ordered

THE Union Pacific has ordered four 33-passenger parlor type motor coaches from the American Car & Foundry Motors Company, New York. These will be sent to Portland for operation by Union Pacific Stages, Inc., one of the Union Pacific motor coach operating subsidiaries. Union Pacific Stages operates motor coach lines in the territory between Salt Lake City, Utah, and Portland, Ore. Another Union Pacific highway subsidiary, Interstate Transit Lines, has routes between Chicago and St. Louis; and Denver, Colo.; Salt Lake City, Utah, and Los Angeles, Cal.

Elmer A. Sperry Dies

ELMER A. SPERRY, inventor of the gyroscope and recently awarded the first Elbert H. Gary Memorial Medal of the American Iron and Steel Institute for inventing and perfecting the steel rail defect detector, died at the St. John's Hospital in Brooklyn on Monday morning.

Mr. Sperry stands next to Thomas A. Edison as an outstanding American inventor of devices of great economic importance. Few men have been so highly honored with prize awards or honors. In spite of this, however, Mr. Sperry was a very modest man and many people, in this as well as in foreign countries, were profoundly touched by his charming and delightful personality. Added to his inventive genius he was possessed of excellent business and administrative ability.

It is significant that many of his inventions have contributed largely to the efficiency and safety of transportation notably in the street railway, automotive, marine, aviation and railroad fields.

Mr. Sperry headed up the American delegation to the recent World Engineering Congress in Japan. His American associates were astounded when they realized how much he had done to warrant the high esteem in which he was held by the Japanese and began to understand why it was that he had been decorated by the Emperor of Japan. It was after his return from Japan that Mr. Sperry wrote the chapter on invention in the book which Doctor Beard edited on "Toward Civilization."

A. R. A. Joins the American Standards Association

THE American Railway Association has joined in the underwriting of the finances of the American Standards Association according to an announcement recently made by W. J. Serrill, president of the A. S. A. The American Railway Association will contribute $15,000 per year for the three-year period of the underwriting. A total of $150,000 per year has been made available through the underwriting to promote the work of the A. S. A. in the establishment of national industrial standards. The other organizations which have joined in the underwriting are: Aluminum Company of America, American Telephone and Telegraph Company, Bethlehem Steel Company, Consolidated Gas Company, Detroit Edison Company, Ford Motor Company, General Electric Company, General Motors Corporation, Gulf Oil Company, Public Service Corporation of N. J., Standard Oil Company of N. J., U. S. Steel Corporation, Westinghouse Electric and Manufacturing Company and Youngstown Sheet and Tube Company.

McKelligon and Stuart Missed

IT IS proving a disappointment to members of the Purchases and Stores convention to learn that A. S. McKelligon, general storekeeper of the Southern Pacific, Pacific Lines, and past chairman of the Purchases and Stores Division, and another past chairman, J. G. Stuart, general storekeeper of the Chicago, Burlington & Quincy, will not attend this year's convention.

Mr. Stuart stands out vividly in the recollections of the Division members not only as the Scotchman whose repartee in convention discussions is always relished, but as a past chairman who did not lose his interest in the association's work, or feel that his obligations to the association were ended, when he had earned its highest honors. Mr. Stuart has made known the fact that he regrets his inability to attend because of his very proper desire to be present at the graduation of his charming daughter from high school. Mr. Stuart will be represented at the meeting, however, in the person of R. D. Long, assistant general storekeeper, who is accompanied by Mrs. Long.

Those who attended the meeting at San Francisco, Cal., last year will always remember A. S. McKelligon as a super host, because of the finished preparations made for last year's trip and the entertainment afforded the delegates and their families while in San Francisco.

Although Mr. McKelligon is unable to attend in per-

son because of pressure of certain work which cannot be postponed for the period that it would take him to come from and return to the Pacific coast, he has made certain that the Southern Pacific will be represented.

General Atterbury Sends Greetings

THREE Tuscan Red special trains of the Pennsylvania arrived in Atlantic City yesterday on a quick run from Chicago, bringing approximately 450 delegates and guests to the Mechanical and Purchases and Stores conventions and the exhibit of the Railway Supply Manufacturers' Association. Gen. W. W. Atterbury, president of the Pennsylvania, sent the following message to the passengers on these trains:

"The Pennsylvania Railroad extends a cordial welcome to the delegates of The American Railway Association now on their way to the Atlantic City Convention. We wish you happy and pleasant journeys and assure you that every effort has been made to contribute to your comfort and convenience on this and other trains of our railroad upon which you are traveling. It is our hope that the convention this year will be the most successful ever held and will be enjoyable to every delegate individually, as well as productive of the best results from the business and professional viewpoint. To this brief message on behalf of our company's management it is a pleasure to add my own personal greetings to the many good friends I have long had in the association."

The special trains were operated as sections of the Liberty Limited, the Pennsylvania's crack train to the Capitol city, and reached Atlantic City at ten o'clock. Each train had a special electric sign attached to the rear end, marked, "A. R. A. Special to Atlantic City" and splendid equipment was provided throughout, including two dining cars, a club car and an observation car on each section.

R. C. Caldwell, division passenger agent of the Pennsylvania, to whom special credit is due for the preparations made for the trip, also accompanied the train to see that everything proceeded in shipshape form.

To facilitate acquaintance on the train and also to provide further for the pleasure of the delegates en route, the *Railway Age* with the co-operation of the Pennsylvania Railroad, issued a bulletin to each passenger, identifying all occupants and carrying messages of greeting from G. E. Smart, chairman of the Mechanical Division, W. Davidson, chairman of the Purchases and Stores Division, and G. E. Ryder, president of the Railway Supply Manufacturers' Association.

Among those arriving on the trains were W. Davidson, general storekeeper of the Illinois Central and chairman this year of the Purchases and Stores Division, who was accompanied by Mrs. Davidson and their son Richard, together with a large delegation from the Illinois Central purchasing and stores department, including A. C. Mann, vice-president; also John Purcell, assistant to vice-president of the Atchison, Topeka and Santa Fe, and past chairman of the Mechanical Division; and past chairman of the Purchases and Stores Division C. C. Kyle, purchasing agent of the Northern Pacific, who was accompanied by other supply officers of the Northern Pacific from as far west as the Pacific coast.

Registration Hours

FOR the greater convenience of both the arriving railway and supply men, Chairman F. E. Dodson of the Enrollment Committee announced that the entire facilities of the office of registration will be available from 9:00 A. M. to 9:00 P. M. each day, including next Sunday. In previous convention years the office of the Enrollment Committee has been open only during certain specified hours.

Copies of Last Week's Railway Age

ALL the delegates attending the convention, as well as readers of the *Railway Age* who did not receive their last week's issue before leaving their offices, can secure copies of the June 14 issue by calling at the *Railway Age* editorial rooms in Space 2, Municipal Auditorium. This issue contains information particularly of interest to railway purchases and stores officers, in furnishing in detailed form the first authoritative figures on the expenditures made by the railways for materials and supplies and for equipment during 1929, as well as the capital expenditures for locomotives and other equipment made during 1929 and during the first quarter of this year. It also contains the *Railway Age* annual report on the value of the unapplied materials and supplies on hand at the close of the year on the different railroads, to including this year detailed figures showing the supply of materials and supplies on hand and used, in major classifications and the turnover reported by the individual carriers, these figures being the first of the kind ever published.

Feature of Traveling Engineers' Program

J. N. CLARK, of San Francisco, general fuel supervisor of the Southern Pacific, is working while here on the program for an entire day's session of the Traveling Engineers' Association on September 24 in Chicago, which will be devoted to the subject, "The Motive Power of Tomorrow".

An imposing array of speakers who will discuss this subject from different points of view already has been secured. From the standpoint of the user of motive power among those who will appear on the program are R. H. Aishton, president of the American Railway Association, M. Cabrera, executive vice-president and general manager of the National Railways of Mexico, and Paul Shoup, president of the Southern Pacific. General W. W. Atterbury will be represented on this part of the program by T. W. Demarest, general superintendent of motive power, Pennsylvania Railroad, Western Region, and an invitation has been extended to Sir Henry Thornton, president of the Canadian National Lines.

The builders of locomotives will be represented on the program by George H. Houston, president of the Baldwin Locomotive Works, William C. Dickerman,

president of the American Locomotive Company, and W. E. Woodward, vice-president of the Lima Locomotive Works.

Other speakers will be S. G. Down, vice-president of the Westinghouse Air Brake Company, George L. Bourne, chairman of the board, the Superheater Company, John E. Mulfeld, and Silas Zwight, general mechanical superintendent of the Northern Pacific.

A few years ago there was arranged under Mr. Clark's leadership an all-day program for the Traveling Engineers' Association on "The Locomotive of Today" which was a great success, and the similar one now being planned for the next meeting is expected to be unusually interesting and constructive.

Registration, American Railway Association

Division V—Mechanical

Acworth, J. S., Supvr. of Equip., Gen'l Am. Tank Car Corp., Ambassador
Anderson, R. W., S. M. P., C. M. St. P. & P., Ambassador
Barnhart, J. D., Supt., Motive Power Equip., Ill., Terminal, Ambassador
Barthelemy, P. P., Assnt. M. C. B., G. N., Brighton
Bentley, H. T., Ret. G. S. M. P., C. & N. W., Marlborough
Bodemer, C. J., Supt. Mchy., L. & N. Traymore
Borell, Elmer A., Engr., M. P., Reading, Ritz-Carlton
Cantley, Wm. I. M. E., I. V. R. R., Haddon Hall
Carver, J. L., Engr. Tests, I. C., Shelburne
Chambers, C. E., Supt. M. P. & R. S., C. R. R. of N. J., Dennis
Christy, Geo. C., Supt. Car Dept., I. C., Shelburne
Deasy, J. F., A. V. P. Opr., Penn.
Deppe, J. A., Asst. Supt. Car Dept., C. M. St. P. & P., Ambassador.
Dunham, W. E., Supt. C. D., C. & N. W., Marlborough.
Endicott, G. F., M. E., No. Pac., Ambassador.
Endsley, Louis E., Prof., Univ. of Pitts., Strand.
Everett, W. A., Con. M. C. B., L. V., Dennis.
Eysmans, J. O., V. P., Penna.
Fell, F. J., V. P., Penna.
Fetters, A. H., G. M. E., U. P., Ritz.
Garber, O. A., C. M. O., M. P., Ambassador.
Geist, J. R., Sp. P. C. I., B. & O., Knickerbocker.
Goodnow, T. H., Vice Pres., Camel Co., Marlborough.
Gordon, G. D., Supt. Rev. M. E., C. M. St. P. & P., Princess.
Hackenberg, J. O., Genl. Supt., Penna.
Hall, E. B., G. S. M. P. & M., C. N. W., Marlborough.
Hall, James, M. C. R. S. P., Chelsea
Hall, M. A., Supt. of Mach., K. C. S., Ambassador
Hankins, F. W., CH. M. P., Penn.
Hardin, F. H., Asst. to Pres., N. Y. C., Traymore
Harrison, J. H., G. C. F., G. N., Ambassador
Jackson, O. S., G. S. M. P. & M., U. P., Ritz-Carlton
James, C., S. M. P., Erie, Chalfonte
Jertsen, G. H., Master Welder, N. P., Ritz-Carlton
Johnson, Harley A., Dir. of Research, A. R. A., Ambassador
Johnston, W. A., G. C. F. U. P., Brighton
Joost, Wm., Div. M. M., C. M. St. P. & Pac., Ambassador
Kass, P., Supt. C. D., C. R. I. & P., Haddon
Kellog, Stanley N., Con. Car Rep., N. Y. C., Shelburne
Kessinger, F. H., Asst. G. B. I., Reading
King, J. A. C., Insp., Penna.
Lee, Elijah, V. P., Penn.
Lentz, John S., Con. M. C. B., L. V., Dennis
Lieber, Geo. W., Supt. Rec., M. K. T., Ambassador
Lohman, A. T., M. M., A. T. & S. F.
McCloskey, C. E., M. M., H. B. & I.
McQuillen, J. E., Mech. Supt., G. C. & S. Fe., Chalfonte
McMunn, W. R., S. R. S., M. D. M C., Ambassador
Machesney, A. G., Ret. M. M., Cornwall, Marlborough
Maitinson, A. M., Div. M. M., C. M., St. P. & P., Marlborough
Marsh, E. P., Asst. Supt. Car Dept., C. & N. W., Ritz
Nash, Sr., J. H., formerly S. M. P., I. C., Ambassador
Nelson, C. J., C. I. I., All Lines, Ambassador
Nicholson, J. M., Fuel Con. Engr., A. T. & S. F., Dennis
Nystrom, K. F., Supt. Car Dept., C. M., St. P. & P., Traymore
Owen, W. J., G. C. F., P. & P. U., Ritz-Carlton
Patten, G. F., Shop For., B. & O., Knickerbocker
Price, C. W., Asst. Elec. Car Ltg. Supvr., B. & O., Knickerbocker
Purcell, John, Asst. to V. P., A. T. & S. F., Marlborough
Putman, Charles H., M. C. B. G. N., Ambassador
Ramsdell, T. M., M. C. B., U. P., Chalfonte
Raps, John F., Genl. L. & B. Insp., I. C., Traymore
Rochester, R. K., Gen. Mgr., Penna.
Robertson, E. J., Supt. Car Dept., Soo Line, Ambassador
Robinson Lee, Asst. to Genl. Supt. M. P., I. C., Shelburne
Roesch, Frank P., Ret. M. M., E. P. & S. W., Dennis
Sanders, T. K., Engr., A. R. A., Ambassador
Scrofer, Frank, Off. Mgr., G. N., Ambassador
Shreeve, John C., M. M., E. J. E., Cheslea
Sheridan, Thomas F., Ch. Cl. S. M. P., P. & L. E., Strand
Tate, M. K., Mgr. of Ser., Lima Loco., Chelsea
Templeman, J. M., Dining Car Steward, B. & O., Holmhurst
Truesdale, J. A., C. I. I., Twin Cities District, Ambassador
Trumbull, A. G., Ch. Mech. Eng., Adv. Mech. Comm., Van Sweringen Lines, Marlborough
Turnbull, R. J., Asst. G. S. M. P., A. C. L., Haddon Hall
Van Sweringen, F. H., Supt. Shops, Mer. Des., Shelburne
Venter, H. C., S. S., S. P., Ambassador
Von Bergen, E., C. E., I. C., Shelburne
Wildin, Geo. W., Past Pres. A. R. A., Chalfonte
Yates, L. L., G. G. C. D., P. F. E., Ambassador
Zwight, Silas, Genl. M. Supt., N. P., Ambassador

Division VI—Purchases and Stores

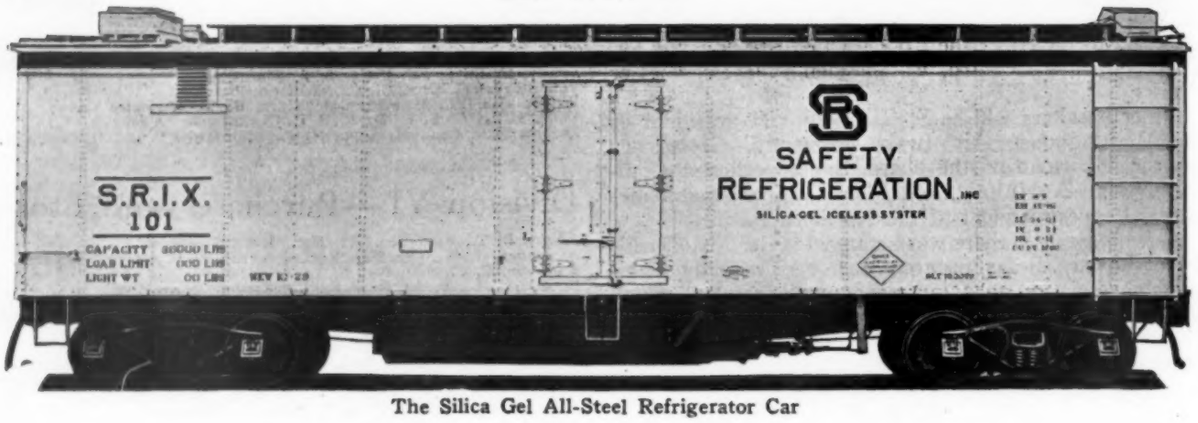
Adams, B. T., Asst. Gen. Str. Kpr., I. C., Shelburne
Alexander, G. W., Gen. Str. Kpr., C. of G., Ritz-Carlton
Anderson, C. C., Stationer, N. P., Lexington
Bennett, J. L., P. A. C. of G., Ritz-Carlton
Colbreath, W. D., Gen. F. Stra., S. B., Strand
Davidson, William, Str. Kpr., I. C., Traymore
Farrell, W. J., Sec. D. VI., A. R. A., Traymore
Guild, L. V., P. A., U. P. Ambassador
Hall, U. K., Gen. Supr. Strs., U. P., Ritz
Hasbrook, E. F., Asst. P. A., C. B. & Q., Ambassador
Hayden, S. A., C. C. to G. S. K., M. K. T., Ritz-Carlton
Howard, William J., I. P. & S. Penn., S. Elberson.
Jackson, J. C., G. Str. Kpr., C. N. Marlborough
Kilmer, L., Ch. Acct. Strs., C. N., Marlborough
Kirk, J. C., Gen. Str. Kpr., C. R. I. & P., Traymore
Kyle, C. C., P. A., N. P., Ritz
Lauderdale, J. H., G. P. A. M. P., Haddon Hall
Long, R. L., Div. Str. Kpr., N. P., Lexington
McCann, J. K., G. P. W. I., C. B. & Q., Ritz-Carlton
McDonnold, K. A., C. C. to K. C. S., Shelburne
McMahon, J. E., Asst. P. A. & G., C. St. P. M. & O. Ambassador
Morehead, W. S., A. G. Str. Kpr., I. C., Traymore
Murrin, C. H., Spl. Acct., I. C., Traymore
New, B. F., Div. Str. Kpr., Sou. Pac., Strand
Nichols, C. A., Trav. Str. Kpr., N. P., Ritz-Carlton
Nichols, J. H., Gen. Str. Kpr., Nickel Plate, Ambassador
Rawson, W. E., A. G. Str. Kpr., S. P., Strand
Ray, William, Str. Inspctr., G. T. W., Marlborough.
Russell, T. K., A. S. D. Serv., I. C., Traymore
Shanks, H. T., P. A., L. & N., Marlborough
Smith, H. M., A. G. S. K., N. P., Ritz-Carlton
Steele, E., Insptr. Strs., Penna.
Stevens, H. C., Str. Kpr., W., Ambassador
Thomson, L. C., Mgr. Strs., C. N., Bret. Hall
Tobey, C. B., Gen. Str. Kpr., L. V., Chalfonte
Turner, F. C., Trav. Str. Kpr., N. P., Ritz-Carlton
Walsh, C. E., P. A., Penna.
Warnicki, J. G., Div. Str. Kpr. I. C., Shelburne
Warren, H. E., Mgr. P. & S., G. M. & N., Ambassador.
Weisenburger, F. V., Timber Agt., N. P., Ritz-Carlton.
Workman, E. A., Mgr. P. & S., C. R. R. of N. J.
Wright, C. I., Gen. Strkpr., M. K. & T., Ritz-Carlton.
Wright, G. S., Gen. Strkpr., E. J. & E., Chelsea.

Motor Transport

Farrin, James M., Spec. Engr. M. T., I. C., Shelburne
Lake, Charles S., Asst. to Pres., C. & O., Marlborough.
Leonard, Miss Florence, Secy. Supt., M. P., Strand.
Lewis, F. E., Gen. Supt., C. I. & L., Ritz-Carlton.
Wanamaker, E., E. E., C. R. I. & P., Chalfonte.

Special Guests

Apfelbaum, Edward, Ticket Agt., Penna.
Bier, G. P., Secy. to G. Str. Kpr., I. C., Traymore
Blatchley, W. E., Gen. Pass. Agt., Penna.
Carbine, J. T., Asst. Gen. T. M., Penna.
Christy, Harold, Shelburne
Cole, L. W., R. S. M. Assn., Y. M. C. A.
Conner, F. W., Pass. Tr. Mgr., Penna.
Davidson, Robert, Traymore
Draney, John, Engr., D. L. & W., President
Eisenman, W. H. Secy., A. S. S. T., Chalfonte
Emmons, Lehman W., Claim Agt., Reading
Endsley, Louis E., Jr., Strand
Everett, G. E., Asst. to Gen. Tr. Mgr., T. A. T.-Maddux Air Lines, Franklin
Glover, Edwin, Insp. Elec. Bur., Atlantic City
Haas, J. S., Publicity Rep., A. R. A. Atlantic City
Harrold, J. W., Chief Clerk, Penna.
Hedges, Louis L., Publicity Rep.
Hess, Frank E., Ambassador
Kadel, B. W., Con. Engr., Traymore
Keown, R. Jr., City Ticket Agt., Penna.
Large, J. B., Gen. T. M., Penna.
Lewis, William F., Ritz-Carlton
McDonnold, Karl A., Jr., Shelburne
McMunn, W. R. Jr., Ambassador
Mackenson, C. T. Jr., Asst. G. T. M., Penna.
Mathews, C. H. Jr., Gen. T. M., Penna.
Mays, Floyd R. Jr., Shelburne
Mays, F. H. Jr., Shelburne
Miller, John E., Chelsea
Mittag, Harold, Sec. to S. C. D., C. M. St. P & P.
Moody, Jack, Shelburne
Moore, Charles H., Ch. Cl., Reading
Murphy, J. B., Div. Pass. Agt., Penna.
Quinn, F. McD, Asst. to G. T. M., Penna.
Ruffu, A. M., Jr., Mayor, Atlantic City
Sheaffer, D. M., Chief Pass. Tr.
Symes, J. M., Supt. Pass. Tr., Penna.
Town, Thomas J., Chief Torpedoman, U. S. S. O. 9, Morton
Truesdale, Jack, Ambassador
Vitanza, C., Publicity Rep. of A. R. A.
Wilson, G. R., Off. Mgr., Penna., Morton Cottage



The Silica Gel All-Steel Refrigerator Car

Freight and Passenger Car Exhibit

Track exhibits of new hopper and steel refrigerator cars de luxe coaches—air-conditioned diner

THE track exhibits of freight and passenger cars have been assembled this year at two points, namely, the Reading Terminal on Atlantic avenue, between Arkansas and Missouri avenues, and the Pennsylvania Terminal on Atlantic avenue, between New York and Tennessee avenues.

At the Reading Terminal there are shown a box car, a mill-type gondola and a steel caboose car by the Reading; a hopper and a gondola car by the Baltimore & Ohio; two container cars by the New York Central (L. C. L. Corporation); several tank cars; a Safety steel refrigerator car, and the Klasing brake demonstration car. The passenger cars shown at this point include a Reading coach, and two coaches and a dining car belonging to the Baltimore & Ohio.

At the Pennsylvania Terminal the Pennsylvania is exhibiting a steel express refrigerator car, a steel-sheathed, double-sheathed box car, two hopper cars and a well-type flat car. At this point there is also a Roebling gondola car loaded with bridge cables and a Pennsylvania de luxe passenger coach.

At both points there are also exhibits of steam locomotives, oil-electric locomotives and rail motor cars.

Reading Freight Cars

The Reading 50-ton capacity all-steel box car is 40 ft. 6¼ in. long inside, weighs 48,500 lb. and has a load limit of 120,500 lb. The inside width is 8 ft. 6 in., the height 9 ft. 3 in., and the capacity 3,185 cu. ft. This car was built by the American Car & Foundry Company and is designated by the road as Class XMu. It is equipped with Taylor flexible trucks, swivel butt couplers. Union centering device, Miner friction draft gear with Farlow attachment, the Ajax hand brake and slack adjuster.

The Reading 70-ton steel gondola car, mill type, is known as Class GHf. It is 61 ft. 6 in. long inside, with drop ends and wood floor. The weight is 66,900 lb. and the load limit 143,100 lb. The capacity is 1,510 cu. ft. The trucks have 6-in. by 11-in. journals and are of the Taylor four-wheel flexible type. The car is equipped with swivel butt couplers, Union centering device, Miner friction draft gear with Farlow attachments, Ajax hand brakes and Royal slack adjusters.

The Reading steel caboose car, Class NMg, is 25 ft. long over the body, or 33 ft. 6 in. coupled, and weighs 43,900 lb. It is equipped with Taylor flexible trucks, Miner draft gear and Ajax hand brakes.

Baltimore & Ohio Freight Car

The Baltimore & Ohio 95-ton capacity hopper car was built at the company shops, Mt. Clare (Baltimore), Md., and is known as Class W. It is particularly interesting in that it is of the all-welded type. There are four main hoppers and, in addition, four corner hoppers which dump at the ends. The sides are flush and recessed at the end for the ladder. The ends of the car are vertical, which explains the corner hoppers and makes the car entirely self-clearing. There is a stiff center bulkhead of corrugated steel plate. The weight of the car is 57,800

Reading 70-Ton Steel Mill-Type Gondola

lb., the load limit 193,200 lb., and the capacity 3,161 cu. ft. The trucks have 6½-in. by 12-in. journals and are of the XLT articulated type. The car is equipped with XLT radical butt couplers, XLT slack adjusters, XLT automatic self-locking door locks, Ajax hand brakes and Alemite lubricated center plates. An interesting feature is the brake-beam suspension. The pin in the brake head slides horizontally in the slot in the hanger bracket, no link being employed.

The Baltimore & Ohio mill type gondola car is 65 ft. long inside, has drop ends and XLT inside collapsible stake pockets. The weight is 63,900 lb., the load limit 146,100 lb. and the capacity 763 cu. ft. The trucks have 6-in. by 11-in. journals. The car is equipped with XLT slack adjuster and Ajax hand brakes, side operated. A particular feature of this car which will be of particular interest is the Duryea cushion underframe.

The other New York Central container is designed for handling brick. It is of the low-side gondola type, 46 ft. long inside, weighs 52,900 lb., and has a load limit of 156,100 lb. The containers, of which they are twelve, are designed to be lifted off by a crane. They have drop bottoms, a capacity of 10,000 lb., weigh 2,300 lb. each and have 1,311 cu. ft. capacity.

At the Pennsylvania Terminal this road is showing two container cars, one of these is a special flat car, Class F31, and holds eight containers each of 10,000 lb. capacity and weighing 3,010 lb. The car itself is 62 ft. long, or 63 ft. 6 in. over striking plates, weighs 62,800 lb., and has a load limit of 147,200 lb. The containers are held by cast-steel stake pockets at the corners.

The second Pennsylvania container car is a modified regular flat car Class P57, which holds five containers. It is 40 ft. long and is provided with special combined stake pockets and corner retainers for the containers themselves.

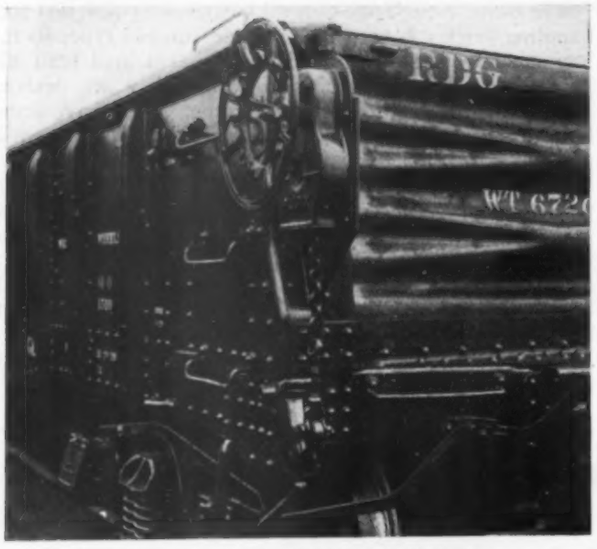
Reading 50-Ton Steel Box Car

Container Cars

At the Reading termnal the New York Central (L. C. L. Corporation) is showing two types of container cars. The general-merchandise type has six containers, each of which is of 10,000 lb. capacity and weighs about 2,930 lb. They are carried on a special drop-side gondola of 50 tons capacity and 46 ft. 6 in. inside. The weight is 59,900 lb. and the load limit 118,100 lb. The sides drop down in sections, one for each container, thus permitting containers to be removed without the use of a crane.

The Pennsylvania Hopper Cars

Two hopper cars are shown at the Pennsylvania terminal. The one is of 70 tons capacity, Class H21A. The weight is 48,500 lb., load limit 161,500 lb., and the capacity 2,547 cu. ft. It is equipped with four hoppers. The particularly interesting feature of this car is the trucks which are equipped with the Timken Roller Bearing Company's inside type of bearing. In these trucks the journals run in boxes supported in pedestals between the wheels in a manner similar to that employed in four-wheel engine trucks.



Outside Application of Ajax Hand Brake on Reading Gondola

The second Pennsylvania hopper is of 90 tons capacity and is of an entirely new type known as H27. It is of the self-clearing type and has six hoppers and three diaphragms. The center still is the A. R. A. type, the sides of the car are flush, with cast-steel inside posts and 7/8-in. Z-bars at the top. The weight is 60,300 lb., the load limit 190,700 lb., and the capacity 3,112 cu. ft. The journals are 6 1-2 in. by 12 in.

The Pennsylvania All-Steel Express Refrigerator Car

This car, of which 550 have been built, is designed for passenger train service and is known as Class RR-50-B. It is of particular interest in that it is of all-steel construction. The car is 53 ft. 5¾ in. over striking plates and has an inside length of 42 ft. 5 in., and a width of 8 ft. 11 in., and weighs 99,000 lbs. The inside is lined with smooth steel plates and has an arched roof which is free from any point where dirt can lodge and permits of easy cleaning with a hose. The floor racks lift up and the end bunkers are of the collapsible type. Miner door fittings are employed. The trucks are of the four-wheel passenger type and are provided with clasp brakes.

Safety Refrigerator Car

Safety Refrigeration, Inc., is showing at the Reading Terminal a new design of all-steel refrigerator car equipped with the silica-gel iceless refrigeration system in which new features have been incorporated.

Other Freight Cars

The Pennsylvania is showing a steel-sheathed, double-sheathed, 50-ton Class X-29. The weight is 44,800 lb., load limit 124,200 lb., and capacity 2,042 cu. ft. An interesting feature is the new type E couplers, bottom-operated, with which the car is equipped.

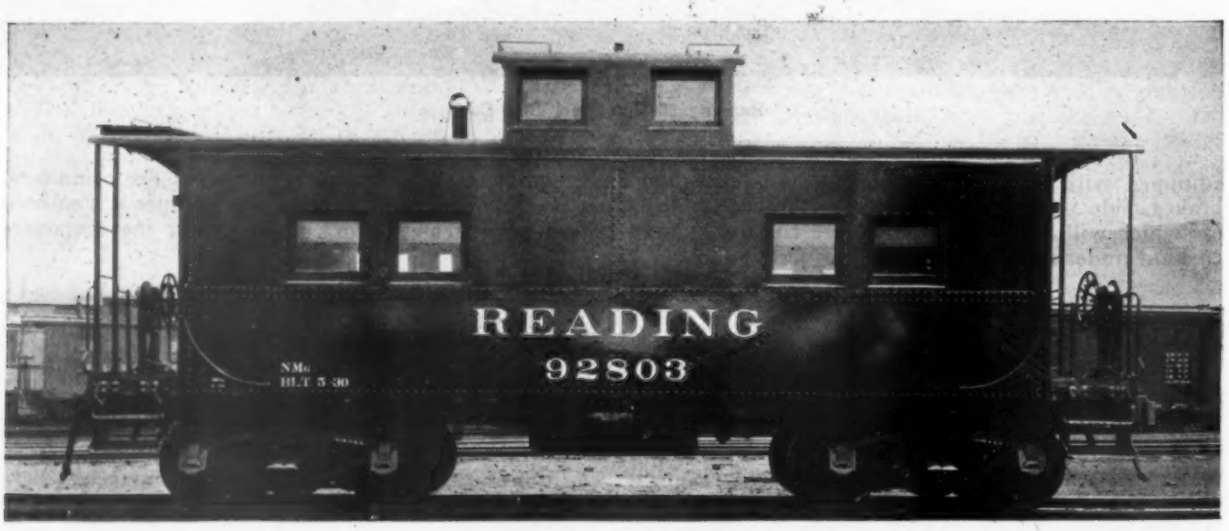
The Pennsylvania exhibit also includes a well-type flat car, Class F-25-B, of 70 tons capacity, 45 ft. over end sills, and with a well 25 ft. long and 7 ft. 8 in. wide. The Lukens Steel Company is showing a large steel boiler plate 4 in. thick, mounted on this car.

At the Pennsylvania Terminal there is also shown a special gondola car for shipment of bridge cables. This was built by the American Car & Foundry Company and is exhibited by the J. A. Roebling Company. The capacity is 90 tons.

At the Reading Terminal several tank cars are on exhibition. One of them belongs to the General Chemical Company and is designed for handling acids. It is of I. C. C. 103-A class and has 70 tons capacity. A feature of the car is the running boards which are of the Alan Wood Diamond-F type. The car is also equipped with Edgewater B-32—K draft gears, handbrakes, Willoughby type, and Royal brake slack adjusters, type K. The car is protected by aluminum paint.

Another tank car belongs to the General American Tank Car Company and is of this company's Type 30.

Taylor Flexible Passenger-Car Truck



Reading All-Steel Caboose Equipped

This car is also protected by aluminum paint and is equipped with a geared handbrake made by the Superior Railway Equipment Company. Both tank cars are provided with brake leverage plates, one being of the cast type and the other of sheet aluminum.

Passenger Car Exhibits

The passenger cars exhibited include a Reading coach, two Baltimore & Ohio coaches, and a Baltimore & Ohio dining car at the Reading Terminal. The Pennsylvania is also showing a coach at its terminal.

The Baltimore & Ohio coaches, of which 50 have recently been built by the Pullman Car & Manufacturing Corporation, are 70 ft. long, of all-steel construction, and seat 80 passengers. The seats are of the Hale & Kilburn over-stuffed revolving type with collapsible center arms and upholstered frieze seat coverings. The cars have double-sash windows with Dennis window ventilators. The heating system is in two units with Vapor type automatic heat control. These coaches have Alemite lubricated center plates and trucks equipped with X. L. T. cushioned rubber insert eliptic springs, rubber-seated equalizers and rubber-seated center plates.

The Baltimore & Ohio dining car "Martha Washington" has seats for 36 and is of a particularly pleasing interior finish. The trucks have Timken bearings and are provided with X. L. T. rubber-seated equalizers, center plates and side bearings, the same as used on the Baltimore & Ohio coaches. The feature of this car which will attract general attention is the provision for air conditioning which has been developed jointly by the railroad Carrier Engineering Corporation and has been in service for the past few months. This system was first applied on the Baltimore & Ohio in June, 1929, on a coach. The 110-volt generator used in connection with the air conditioning equipment has a Diehl mechanical positive drive.

The Reading 63-ft. steel passenger coach is equipped with Taylor flexible passenger-car trucks and Hyatt bearings.

The Pennsylvania has on exhibition one of its new de-Luxe coaches, Class P-70, now used on limited trains. The seating arrangement is very modern and comfortable as will be evident from the fact that provision is made for only 39 passengers, two being seated on one side of the aisle and one on the opposite side. Smoking rooms and toilet facilities of unusual completeness for day coaches are provided at each end, accommodations for men being provided at one end and for women at the other end of the car.

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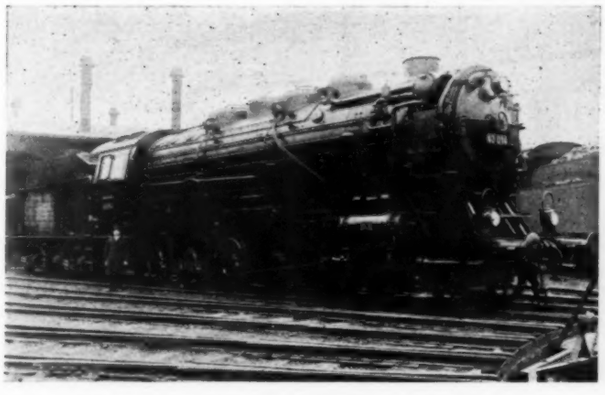

A 2-10-0 Type Locomotive on the German State Railways

Conventionalities

Fred Schaff, of the Superheater Company, is attending the convention this year in his new official capacity as president of the company. He is accompanied by Mrs. Schaff.

The friends of Morris Brewster will miss him this year. He died a few weeks ago in Chicago. He was a constant attendant at the conventions since the old Saratoga Days around 1904. John Ash is carrying-on for him.

Bard Browne, of the Superheater Company, has joined the ranks of the golf hounds and is an enthusiast in double par matches. His scores, in keeping with his new offices on the forty-second floor on Forty-second street, New York, are still in the clouds.

Bobby Wells, the smiling Hunt-Spiller man from the West Coast, is missing the convention this year for the first time in fourteen years. He will attend the American Electric Railway Convention at San Francisco.

W. R. McMunn, superintendent rolling stock, Merchants Despatch, is enthusiastic over the record his company made this last year in moving 36,000 carloads of potatoes out of New England over the Bangor & Aroostook Railroad.

Jim Ralston, of the Westinghouse Air Brake, was somewhat disturbed Monday evening when he rushed up to the Registration Booth and wanted to know why his friends derived such keen amusement over the triangular registration badge he was wearing. The lady's badge was changed for one of more masculine proportions.

George W. Wildin, president of the American Railway Master Mechanics' Association, 1909 to 1910, was an early arrival—in rare good health and expressing his liking of the new Auditorium and exhibit halls. Mr. Wildin is ready to tell the younger generation how to live and accomplish things.

"Everything is different," was the popular, almost universal comment on the part of both the exhibitors and interested observers in the Auditorium yesterday. The reason for the expression was obvious—our first exhibit and meeting place was on the original Steel Pier at Atlantic City in 1906 (and by the way, that meeting was the fortieth annual convention of the Master Car Builders' Association)—then we went over to Young's Million Dollar Pier, where for many years we, as a convention, have been well taken care of—the pier, as a meeting place, became very popular. Its popularity increased as the convention and exhibit years rolled by. Now, in the year 1930, we have moved into entirely new and untried surroundings in Atlantic City's beautiful Auditorium; hence the expression of opinion as quoted above. When we become thoroughly settled in mind and under the new

conditions now surrounding us, it is earnestly hoped that increased efficiency and satisfaction will prevail.

When it comes to old-timers and their records for convention attendance, George Storrs Bigelow, Chicago, wants to tell his story last, perhaps on the theory of the last story being the best. At any rate, Mr. Bigelow enjoys the enviable record of having attended these conventions, with nary a miss, for forty-five years. Next!

C. R. Crook, secretary of the Canadian Railway Club, reports a banner year for that club. It has 310 new members; there was an attendance of 700 at the annual dinner in January; and over 1,000 attended the April meeting to hear the address of President E. W. Beatty, president of the Canadian Pacific Railway. The club has changed its constitution so that its fiscal year coincides with the calendar year.

Gilbert P. Bogert received many congratulations from friends yesterday. He is attending his first convention as vice-president of the Oxweld Railroad Service Company. Mr. Bogert was recently elected to the office of vice-president and assigned to duties at Chicago headquarters. For some years he has served with the Oxweld Company as vice-president of the Canadian Railway Service Company.

J. E. Buker, vice-president of the Vapor Car Heating Company, when registering this year, recalled that he has been to every convention since that at Cape May, in 1891. At that time he was superintendent of the Hicks Stock Car Company. He was president of the M. C. B. Association in 1906. He went with the Vapor Car Heating Company in 1910, leaving the Illinois Central as assistant superintendent of motive power in charge of the car department.

John Platt, president of Hunt-Spiller Manufacturing Corporation, is looking particularly fit after his rather serious operation of a few weeks ago. He and Vic. Ellet made an interesting stop-over at Joe Chidley's farm, at Coburg, Ont., on their way to the Fuel Convention last month. John is looking forward to his annual pilgrimage to Harwichport on Cape Cod, this summer.

Harry A. Flynn arrived in town Tuesday so worn out from his activities at the recent convention of the Air Brake Association at Chicago that it was necessary for him to supervise the setting up of the New York Air Brake Company's exhibit in the Auditorium from his room in the hotel. His ability to supervise work of all kinds "in absentia" was one of the reasons it is said, for his being elected vice-president of the Air Brake Appliance Association. Harry's executive ability should make him a worthy successor to A. S. Lewis, Barco Manufacturing Company, who was elected president of the Air Brake Appliance Association at the convention in May.

Joe Motherwell, vice-president and general manager of the Ashton Valve Company, saw Fred MacArthur, one of his old friends on the "Frisco", on a recent western trip. Mr. MacArthur was retired from the "Frisco" on December 1, last, after 36 years of railroad service. He has many interesting experiences to relate. One of his earliest recollections in railroad work was his contact with the old Fontaine locomotive, on which he was called upon to make a few adjustments on its passage through Jackson, Mich., on its way to Chicago in the 80's. For those who cannot remember that far back, this locomotive was designed with a pair of intermediate driving wheels on the top of the locomotive which drove the driving wheels by frictional contact. Mr. MacArthur took particular delight in accounting for this design to his gullible friends by saying that the engine was so top-heavy that if it should tip over it could still run upside-down. Mr. MacArthur was superintendent of motive power of the old Kansas City, Fort Scott & Mexico, now a part of the Frisco. He was a great collector of old locomotive pictures and has passed on to Joe Motherwell some interesting photographs of old locomotives, including the Fontaine, which Joe has with him here at Atlantic City. These will be presented to Mr. Conway later for his collection.

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Atlantic Coast Line Photo

The Broad Street Station at Richmond, Va.

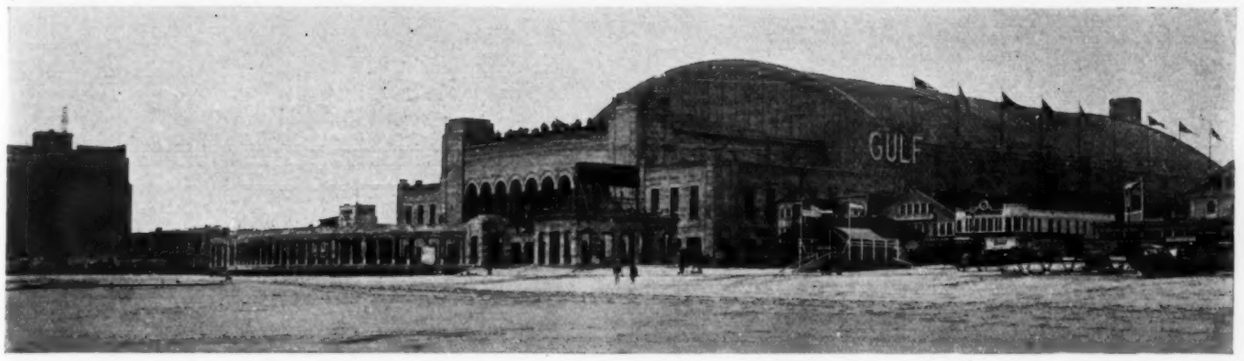

Exhibit Housed in New Quarters

Use of two floors in convention hall makes it possible to place the exhibits under one roof

MOVING day is always an event, especially after one's abode has been in the same house for many years. Many of the old timers remember when the exhibit was held on the Steel Pier in 1906, which was the first year the conventions were held at Atlantic City. The following year marked the removal of the conventions and exhibits to the Million Dollar Pier, which afforded an exhibit space of approximately 103,000 sq. ft. Seventeen exhibits of the R. J. M. A. were held on the Million Dollar Pier. The exhibits in recent years far outgrew the facilities on the pier and, for the last two exhibitions, the Atlantic City authorities erected large temporary structures to provide additional floor space. The moye into the new Municipal Auditorium provides an exhibit space of 278,000 sq. ft.

The building was dedicated by Vice-President Curtis on May 31, 1929. The dedication also celebrated the opening of the exhibition of the National Electric Light Association which was held in connection with the Golden Jubilee of Light. Over twenty conventions and exhibits have been held in the Municipal Auditorium since that time, the last previous to those of the A. R. A. and R. J. M. A. being that of the Radio Manufacturers' Association. It is reported that the Radio exhibition attracted an attendance of nearly 32,000 people.

The Municipal Auditorium makes it possible to hold all of the exhibits and all of the meetings under one roof. According to reports received last evening, over 107,000 sq. ft. of floor space is being occupied by 335 exhibitors. The Exhibit Committee is still receiving requests for exhibit space assignments.

Visitors will appreciate the manner in which the exhibits have been consolidated on the two floors. The arrangement affords a minimum of travel on foot and visitors will find that the inspection of the many exhibits will not be as fatiguing as in former years. Lounges where one may rest and chat with friends and acquaintances have been provided in front of the stage on the upper floor and near the center of the lower floor.

The arrangement of lounge and fountain lends an unusually attractive and inviting appearance to the exhibit on the lower floor. Wide stairways lead from both

New Municipal Auditorium in Which the Conventions Are Being Held

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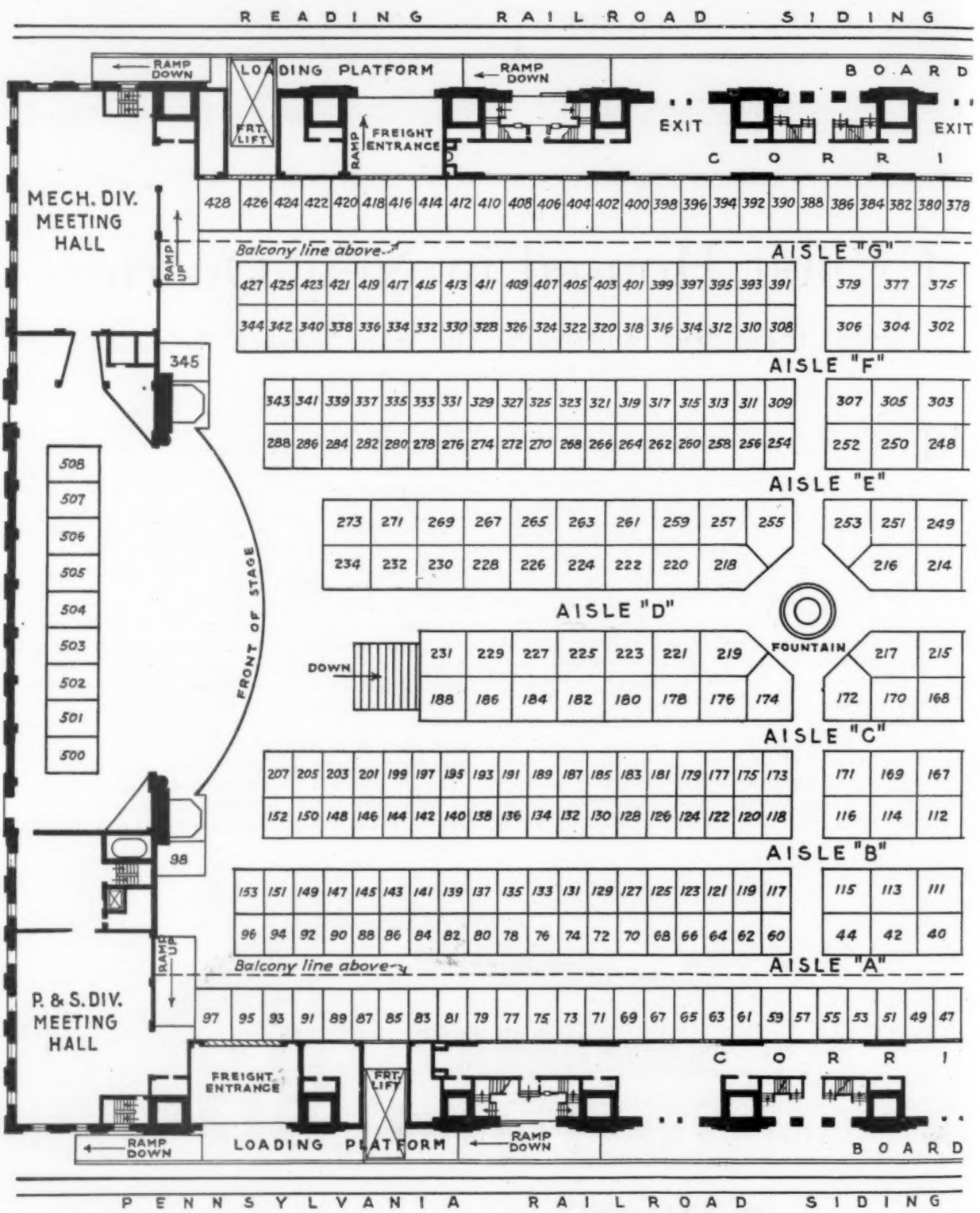
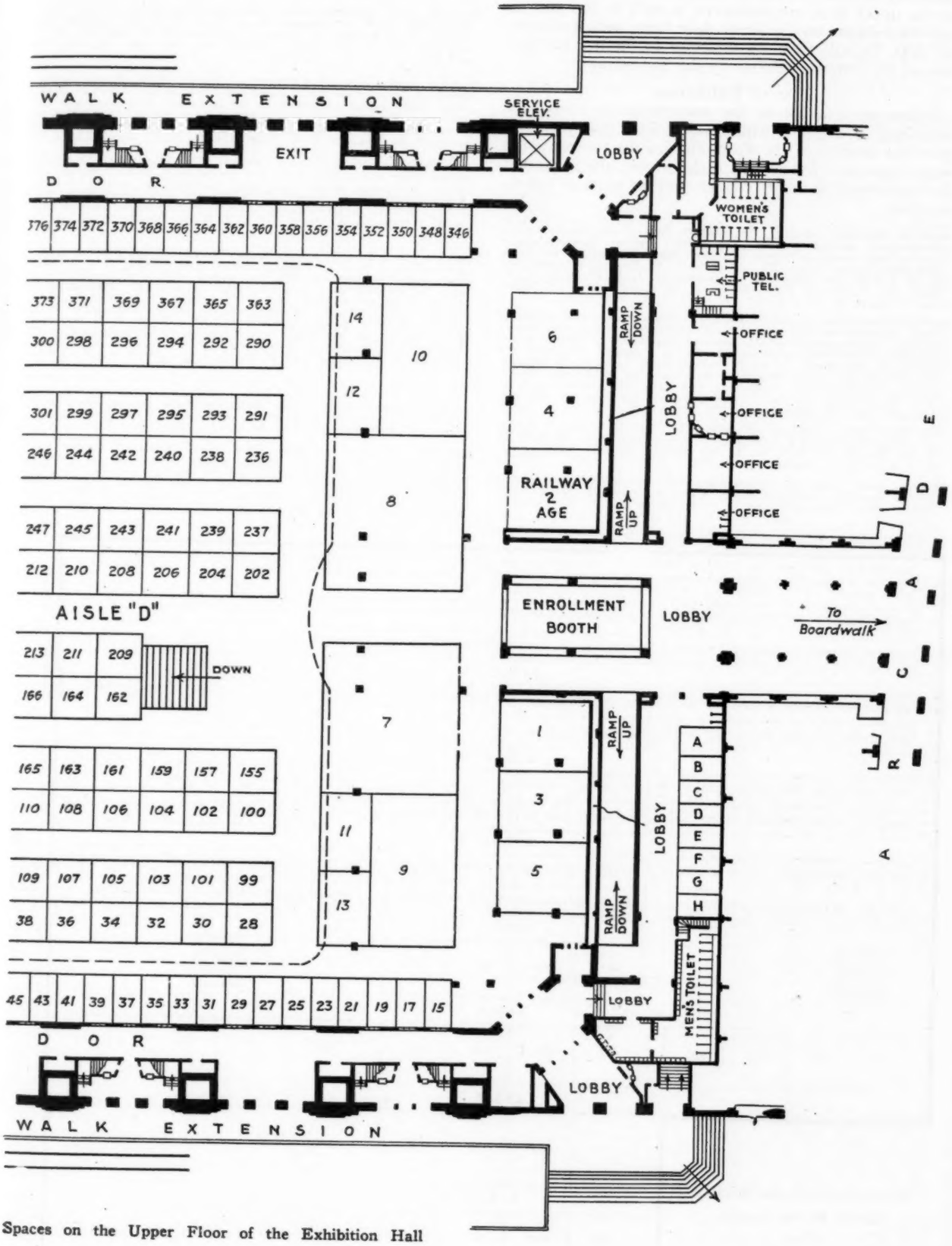


Location of Meeting Rooms and Arrangement of Exhibit



Spaces on the Upper Floor of the Exhibition Hall

ends of the upper floor to the exhibits on the lower floor. If the visitor keeps in mind that the exhibit spaces on the upper floor are numbered from 1 to 500 and up and the exhibits on the lower floor begin with the number 600, he will have no difficulty in finding his way around the various exhibits in the auditorium.

List of Exhibitors

Following is a list of the manufacturing companies exhibiting in the Municipal Auditorium this year. It gives the location of the main office of the company, the more important features of each exhibit, the names of the representatives in attendance, and the space or spaces occupied.

Adams & Westlake Company, The, Elkhart, Ind.—Brass sash; curtains; diaphragms; vestibule curtains and rollers; lighting fixtures; engine lamps; gage lamps; passenger car trimmings. Represented by A. S. Anderson, W. A. Smith, W. S. Hamm, E. H. Stearns, Howard Seip, E. H. Leisch, Ross Hayes, E. L. Langworthy, J. A. Wendland, C. E. Banta, W. J. Piersen, Ralph Brown, H. G. Turney and E. E. Whitmore. Spaces 75, 77 and 79.

Air Reduction Sales Company, New York.—Airco oxygen and acetylene; Airco National carbide; Airco-Davis-Bournonville welding and cutting apparatus and supplies; carbide lanterns and wrecking lights; demonstration of Airco-Davis-Bournonville No. 4 Oxygraph (roughing out machine). Represented by E. M. Sexton, B. N. Law, R. T. Peabody, W. H. Ludington, H. L. Fogers, R. F. Helmkamp, Joe Kenefic, W. W. Barnes, J. A. Warfel, H. A. Hocking, J. A. Daley, R. C. Holcomb, F. E. Mull, D. Anglada, G. Van Alstyne and J. F. Callahan. Spaces 142, 144, 197, 198, 724, 725, 726 and 727.

Ajax Hand Brake Company, Chicago.—Ajax hand brake for all classes of freight cars, including caboose cars. Represented by C. N. DeGuire, R. W. Burnett, R. E. Lave, H. W. Schulze, William Leighton and E. S. Richardson. Spaces 312 and 314.

Allegheny Steel Company, Brackenridge, Pa.—Asco ARA torsion spring journal box lids; Allegheny metal, a corrosion-resisting chrome nickel ferrous alloy. Represented by H. S. Brautigam and H. R. Campbell. Space 108.

Aluminum Company of America, Pittsburgh, Pa.—Structural shapes, castings, forgings, etc. Represented by S. K. Colby and J. O. Chesley. Spaces 500, 501, 502, 503, 504, 505, 506, 507, 508 and 509 on stage.

American Arch Company, Inc., New York.—Locomotive arch brick. Represented by B. A. Clements, G. A. Price, J. P. Neff, Samuel MacClurkin, J. D. Brandon, T. Mahar, G. M. Bean, W. E. Salisbury, E. T. Mulcahy and W. W. Neale. Spaces 166, 168, 170, 172, 213, 215 and 217.

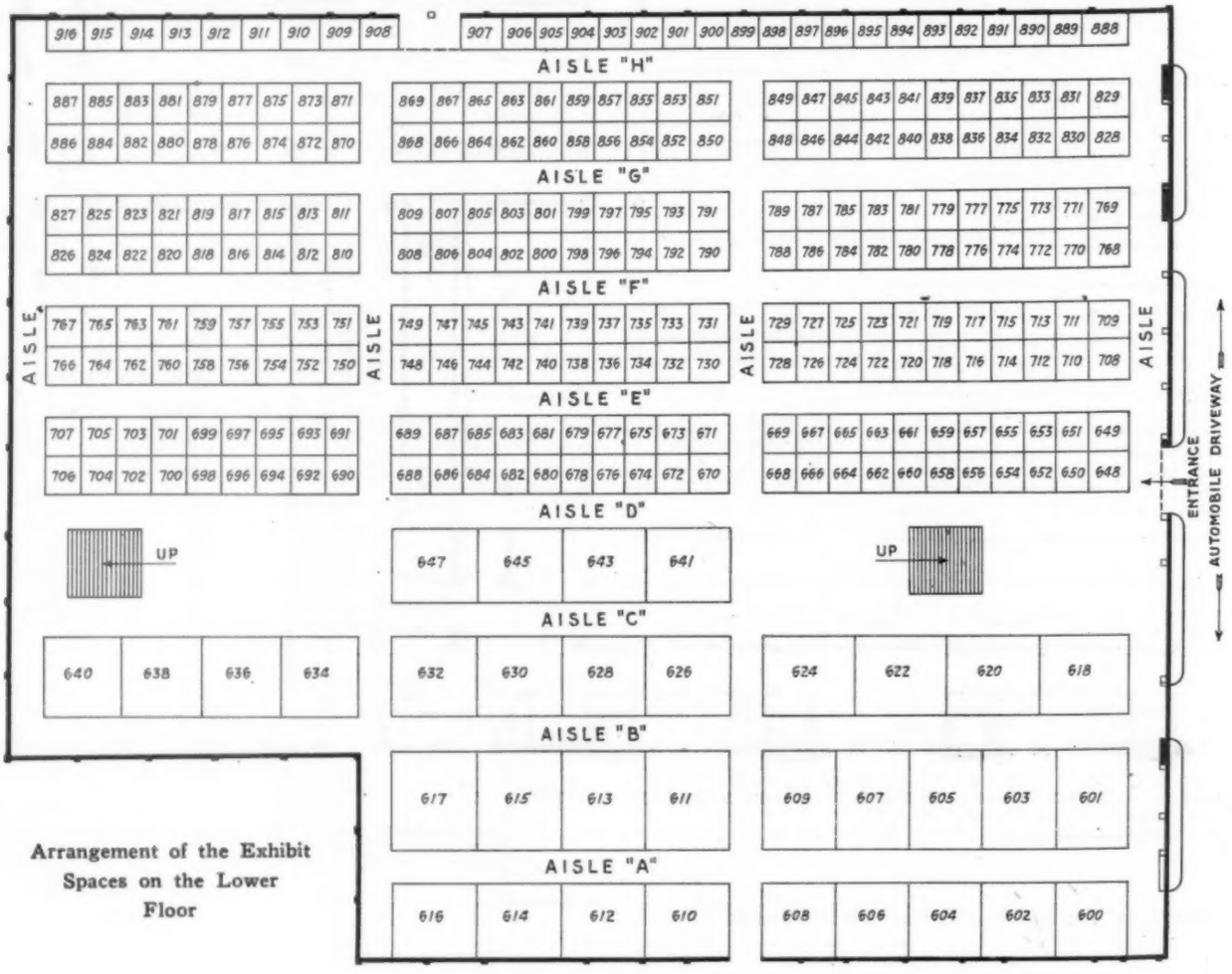
American Brake Materials Corporation, Detroit, Mich.—Latest developments of Keeper type, tab end and full coverage type American Brakebloks; brake assembly installations for heavy and light duty buses and trucks and for various designs of external and internal type brakes for pleasure cars. Represented by Thomas Finigan, W. A. Blume, H. A. Gilles, H. E. King, and E. W. Kisby. Spaces 19, 21, 23, 25, 27 and 29.

American Brake Shoe & Foundry Company, The, New York.—Locomotive driver brake shoes; flanged car and engine truck shoes; unflanged car shoes; combination driver brake shoe; malleable iron brake shoe keys. Represented by F. W. Sargent, M. M. Trainer, R. D. Jenks, R. E. Tolt, J. T. Talbot, E. L. Janes, G. E. Anne, T. S. L. Seaman, L. R. Dewey, J. W. Waters, H. W. Hurst and E. P. Biggs. Spaces 19, 21, 23, 25, 27 and 29.

American Car & Foundry Company, New York.—Various styles of passenger car seats; a. c. f. Berwick electric rivet heaters; a. c. f. metal and forging heaters; especially constructed gondola car equipped with reels for carrying steel cable for bridge construction. Represented by H. W. Wolff, W. E. Hedgcock, H. E. Graham, W. A. Williams, H. I. Dunphy, M. C. Shands, A. E. Ostrander, V. R. Willoughby, F. C. Cheston, F. H. B. Fowler, Robert Rogers, R. J. Smith, F. A. Stevenson, C. D. Terrell, E. H. Fisher, J. J. McBride J. L. Onderdonk, C. B. Collins, L. W. Martin, J. M. Keller, C. P. Dickerman, A. Speir, W. L. Richeson, L. P. Pratt and O. H. Mellum. Spaces 219, 221 and 708.

American Engineering Company, Philadelphia, Pa.—One-quarter Lo-Hed monorail electric hoist, push button control; one-half type A hand geared monorail electric hoist; "Rhodes" metallic packing. Represented by E. C. Lindsay, H. S. Thoeneke, C. Boecker, H. R. Lukens, C. V. Koons, J. S. Neisser, W. T. Duke and J. Irvin. Space 783.

American Locomotive Company, New York.—Staybolts; reverse gear; throttle gear; bell ringer; Flextite casing; lateral motion; extended bumper bracket; four-wheel inside bearing engine truck; two-wheel outside bearing engine truck; four-wheel outside bearing engine truck; expansion guide; Becker wrist pin; Ni-Iron; boiler brace; handrail column; pipe clamp; driving box spreader and cellar. Represented by



Arrangement of the Exhibit Spaces on the Lower Floor

D. W. Fraser, F. J. Foley, N. Naylor, J. G. Blunt, S. Miller, H. Davis, F. J. Reynolds, E. Sheffel, R. H. White, G. Gurry, J. Kindevater, E. Duchesne, W. E. Corrigan, J. H. Link, C. H. Apps, A. C. Negus, W. D. Jenkins, K. Auburn, R. McCaw, D. J. Coleman, C. B. Baxter, A. Hamilton, H. J. Downes, W. H. Clark, W. K. Farrell, C. M. Bell, P. T. Egbert, E. H. Dickinson, M. D. Raymond, R. Anderson, C. L. Reinhart, A. W. Bruce, G. P. Robinson and H. Dean. Spaces 214, 216, 249, 251 and 253.

American Rolling Mill Company, The, Middletown, O.—Armco ingot iron locomotive jackets sheets, special analysis and finish; freight and passenger car plates and sheets for both interiors and exteriors; Armco ingot iron brine tanks for refrigerator cars. Represented by H. M. Arrick, E. C. Bray, E. M. Arndt, W. A. Dibblee and W. W. Graham. Space 189.

American Steel Foundries, Chicago.—Bolsters; brake beams; couplers; roller bearing truck; side frames; yokes; springs; steel wheels. Represented by G. E. Scott, R. H. Ripley, W. J. Lynch, F. B. Ernst, G. F. Slaughter, W. C. Doering, G. G. Floyd, W. R. Gravener, C. L. Heater, L. E. Jones, D. M. Light, P. A. Martin, W. R. Martin, R. W. McKisson, A. W. MacLaren, A. H. Peycke, C. B. Pierce, H. D. Richardson, S. W. Sargent, W. S. Spieth, W. A. Stearns, W. G. Wallace, J. E. Wright and A. Withall. Spaces 100, 102, 104, 155, 157 and 159.

American Throttle Company, Inc., The, New York.—American multiple throttle. Represented by F. A. Schaff, G. E. Ryder, C. H. True, R. M. Osterman, Bard Browne, R. R. Porterfield and E. A. Averill. Spaces 210, 212, 245 and 247.

Anchor Packing Company, The, Philadelphia, Pa.—Locomotive throttle packing; locomotive air pump packing; locomotive ball joint packing; general display of railroad and power plant packings; rubber inserts for passenger cars; brake lining. Represented by L. E. Adams, G. M. Adams, D. J. P. Murray, J. D. Robb, D. M. Allan, J. P. Landreth, P. Forestell, A. E. McElwee, D. J. Irwin and George E. Peachey. Space 185.

Ardco Manufacturing Company, Hoboken, N. J.—Automatic drifting valve; safety cylinder cocks; engine trailer and truck cellars; car journal oilers. Represented by H. O. Wittpenn, Charles Stern, John T. Soltman and M. C. M. Hatch. Space 303.

Ashton Valve Company, The, Cambridge, Boston, Mass.—Locomotive muffled and open pop safety valves; single and double dial illuminated locomotive steam gages; illuminated dial quadruplex air brake gages; back pressure gages; wheel press recording gages and attachments; dead-weight gage testers; test gages; locomotive driving wheel quartering gages; whistles; safety valves. Represented by George B. Allen, H. D. Cameron, H. O. Fettinger, J. F. Gettrust, J. W. Motherwell and Lewis B. Rhodes. Space 408.

Atkins & Company, E. C., Indianapolis, Ind.—No. 18 Kwik-Kut machine; No. 4 metal band saw machine; hacksaw frame display board; hacksaw blade display board; machine knife board; circular saw display board; hand saw display board; band saws; hand saws. Represented by E. S. Norvell and L. Blackwell. Space 122.

Automatic Transportation Company, Inc., Buffalo, N. Y.—Automatic type LG-3, 6000-lb. capacity spur gear drive elevating platform truck; "Automatic" type TGN-4 twin wheel spur gear drive tractor; "Automatic" type CEG heavy duty spur gear drive locomotive crane truck; "Automatic" type TLG-3, 6000-lb. capacity, spur gear drive tiering lifting truck. Represented by Russell J. Mulholland, Andrew C. Bartlett and Edwin C. Laffey. Spaces 764, 765, 766 and 767.

Baker-Raulang Company, The, Cleveland, O.—CYA-60 locomotive type crane trucks; F-3 elevating truck with swivel crane truck; H-3 three-ton HyLift truck. Represented by A. J. Gates, B. C. Hooper and H. B. Greig. Spaces 744, 746 and 748.

Baldwin Locomotive Works, The, Philadelphia, Pa.—Reception booth. Represented by A. H. Ehle, S. McNaughton, J. F. Hoerner, C. E. Hale, Walker H. Evans, W. B. Keys, A. S. Goble, A. B. McCoy and Curtis G. Greene. Spaces 297 and 242.

Barco Manufacturing Company, Chicago.—Barco all-metal connections for air, steam, oil and water between locomotive and tender and for oil and air pipes between high and low pressure units on Mallet locomotives; Barco all-metal steam heat connections for rear of tender and between passenger cars; Barco flexible joints for connections to air reservoirs, air pumps, distributing valves, headlight generators, brake cylinders, feedwater pumps and other auxiliary devices; Barco flexible joints for roundhouses, shops, yards, etc.; Barco automatic smokebox blower fittings; Barco lubricated plug valves; Barco power reverse gear; Cleveland float low water alarm. Represented by C. L. Mellor, F. H. Stiles, A. S. Lewis, W. J. Behlke, C. O. Jenista and F. M. Roby. Spaces 224 and 263.

Barrett-Cravens Company, Chicago.—Barrett lift trucks; Barrett portable elevators; Barrett structural steel storage racks; Barrett barrel trucks. Represented by Edwin J. Heimer. Spaces 762 and 763.

Bauer & Black, New York.—First aid kits and cabinets; surgical dressings for the hospital and first aid room. Represented by C. H. Sigler and Irving Standiford. Space 3-B.

Bendix-Westinghouse Automotive Air Brake Company, Pittsburgh, Pa.—Display board showing complete air brake equipment for bus or truck and trailer; front axle with automotive air brake equipment (operative); sectioned automotive air brake devices. Represented by R. M. Heinrichs, S. Johnson, Fred L. Hall, A. Vance Howe, C. A. Ohl, D. H. Robinson and R. H. Casler. Spaces 680 and 682.

Berry Iron & Steel Company, St. Joseph, Mo.—Locomotive steel castings. Space 773.

Bethlehem Steel Company, Bethlehem, Pa.—Auxiliary locomotive; wheels and axles; boiler and firebox plate specimens; boiler tubes; steel railroad ties; heat-treated bolts and nuts; alloy steel springs; pipe; sheets; tool steel; stainless steel; rail and wheel contour scribing machine; wire fencing; wire products. Represented by G. F. Hocker, J. H. Smiley, A. K. Root, S. B. Leonard, J. Honeycutt, R. Knibloe, N. E. Salsich, O. W. Johnson, G. Bentley, P. J. Scott, D. W. O'Leary, W. Stoever, D. C. Roscoe, G. Armstrong, E. B. C. Coyne, W. S. Lippincott, W. B. Pritchard, G. W. Struble, R. J. McCarty, A. B. Dunn, C. H. Froelich, F. Huffman, M. Vickers, I. C. Jordan, H. Wysor, J. E. Tesseyman, G. A. Oyer, J. W. Murphy, P. J. Treacy and R. S. Folk. Spaces 35, 37, 39, 41, 43 and 45.

Bettendorf Company, The, Bettendorf, Iowa.—Bettendorf swing motion caboose truck; Bettendorf roller bearing freight car truck; Bettendorf 50-ton freight car truck Dalman one-level type; cast steel hopper car door frames; cast steel hopper car door. Represented by J. W. Bettendorf, E. J. Bettendorf, W. E. Bettendorf, K. M. Hamilton, F. W. Lewis, F. K. Shults, C. J. W. Clasen and J. Brady. Spaces 304 and 306.

Bird-Archer Company, The, New York.—Locomotive water conditioner; Baco blow-off cocks; Bird-Archer sludge remover; sample of boiler chemicals. Represented by P. B. Bird, L. F. Wilson, W. E. Ridenour, H. C. Harrigan, F. K. Tutt, C. A. Bird and L. C. Calder. Space 11.

Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa.—Miscellaneous alloy steel locomotive and car castings. Represented by R. A. Cannon, M. R. Martin and C. H. Mekeel, Jr. Space 133.

Bosch Magneto Company, Inc., Robert, Long Island City, N. Y.—Robert Bosch Acro system of fuel pumps and injectors for solid injection Diesel type automotive engines; Robert Bosch magnetos, spark plugs, battery ignition, generators, starters, horns, windshield wipers and other automotive electrical equipment for bus use; Robert Bosch semaphore direction signal for buses. Represented by A. J. Poole, J. T. Lansing and F. J. Mackey. Space 143.

Bradford Corporation, The, New York.—Bradford rocker type draft gear; Bradford friction draft gear; Chambers, Bradford and Wagner throttle valves; throttle valves for Bethlehem auxiliary locomotives; Huntoon truck bolster; Huntoon and truss rod brake beams. Represented by Horace Parker, A. A. Helwig, J. C. Keene, G. L. Kilmer, H. F. Lowman, I. T. Mays, A. F. Stuebing, E. H. Walker and B. C. Wilkerson. Spaces 222 and 261.

Bradley & Son, Inc., C. C., Syracuse, N. Y.—Bradley hammers especially adaptable for reclamation work; samples of reclaimed materials forged under Bradley hammers; Johnson hydro-pneumatic portable car jack. Represented by C. Goodwin Bradley, S. G. Rockwell and Charles Strodel. Space 703.

Brewster, Inc., Morris B., Chicago.—James driving box; Brewster metallic packing, Brewster locomotive oil cans. Represented by John T. Ash. Space 395.

Briggs & Stratton Corporation, Milwaukee, Wis.—Railway car window lifters; rail saw; rail drillers. Represented by H. Bradley Davidson, Jr., Stanley W. Nicholson and C. L. Otremba. Space 91.

Brill Company, The J. G., Philadelphia, Pa.—Brill models 860 and 660 gasoline engines for gas-electric cars; Brill electric "Multi-tool"; photographs. Represented by C. J. McPherson, A. W. Holbrook, F. A. Keihn, Charles Chandler, C. B. Schade, W. J. Beatty, A. H. Hudson, E. T. Bronenkamp, A. F. McCormick and J. C. Bryan. Spaces 368-370 and 372

Buckeye Steel Castings Company, The, Columbus, O.—Buckeye cast steel yokes and draft attachments; A.R.A. type "D" and A.R.A. recommended type "E" couplers; cast steel truck bolsters and integral box side frames for standard A.R.A., Q.W.C. and Dalman trucks; miscellaneous freight car castings; Buckeye six-wheel tender truck model. Represented by J. G. Bower, F. J. Cooledge, M. R. Hansen, G. T. Johnson, J. C. Larsen, W. W. Matchneer, H. A. Moeller, H. W. Stertzbach, G. A. Sutherland, A. H. Thomas, J. C. Whitridge and H. H. Wolfe. Spaces 57, 59, 61 and 63.

Buckeye Tool Company, The, Dayton, O.—Hercules portable pneumatic tools, including No. 163-4 frame jaw grinder; No. 113-3 pencil grinder; Nos. 216 and 217 right angle type nut drivers; Nos. 246 and 247 close quarter drills; No. 362-4 sander and grinder, etc. Represented by W. W. Price, W. R. Gummere, H. O. Gummere and H. J. Bannister. Space 3-A.

Buda Company, The, Harvey, Ill.—New improved types of journal, self-lowering, and standard speed jacks; heavy jack-type rail benders; car replacers. Represented by F. L. Gormley, G. A. Secor and G. W. Hoover. Space 76.

Buffalo Brake Beam Company, New York.—Brake beams; brake beam parts; auxiliary supports; absorption side bearings; hinged draft gear carrier; bottom rod safety loops; brake beam bottom rod safety loops; self-locking brake pins; self-locking brake shoe keys; self-locking draft key locks; miscellaneous malleable iron castings; galvanized metals. Represented by S. A. Crone, A. E. Crone, C. R. Busch, E. Strassburger, E. F. Gladwell and F. O. Parker. Spaces 128 and 183

Burden Iron Company, Troy, N. Y.—Burden Best Iron rivets. Represented by John C. Kuhns and William Downs. Space 699.

Byers Company, A. M., Pittsburgh, Pa.—Wrought iron products. Represented by J. H. Ainsworth, E. B. Story, F. W. Stubbs, C. W. Damberg and C. A. Croft. Space 13.

Camden Forge Company, Camden, N. J.—Nitrided steel forgings. Represented by T. H. Higgins. Space 415.

Camel Sales Company, Chicago.—Youngstown corrugated all-steel side doors for box and automobile cars; Camel Company top and bottom supported side door fixtures for box and automobile cars; Camel Company movable post arrangement and end door fixtures for automobile cars; Camel Company reinforcing steel frame for door opening of wood superstructure of box and automobile cars. Represented by W. W. Darrow, H. E. Greer, T. H. Goodnow, F. C. Heinen, K. J. Tobin, A. G. Dohm and C. E. Eklind. Spaces 424, 426 and 428.

Cardwell Westinghouse Company, Chicago.—Cardwell friction draft gears; Westinghouse friction draft gears; Cardwell spring barrel friction draft gear; Cardwell friction truck spring. Represented by L. T. Canfield, C. J. Gorman, W. G. Krauser, J. E. Tarleton, W. Eckels, G. W. Wildin, R. W. Schulze, J. M. Hall, J. A. King, J. W. Bridge, C. A. Danielson and R. H. Owens. Spaces 238 and 293.

Carnegie Steel Company, Pittsburgh, Pa.—Four pairs of various types of steam railroad wheels and two pairs of wheels that have shown commendable records in service, displayed on a track laid on Carnegie steel crossties; samples of Carnegie beams, floor plate and special car building sections. Represented by C. L. Wood, J. C. Shields, J. S. Oursler, C. F. Rys., C. C. Cluff, J. R. Mills, G. H. Vant, L. C. Bihler, F. J. Black, J. F. Miller, R. E. Maxwell, Charles Orchard, J. Neubauer, R. W. Steigerwalt, C. G. Purnell, W. I. Parry, A. C. Jack, E. K. Bauer, A. R. Williard, R. L. Twitchell, G. R. Schreiner and Samuel Clements, Jr. Spaces 184, 186 and 188.

Carrier Engineering Corporation, Newark N. J.—Photographs of air conditioning equipment. Represented by O. M. Ragsdale and L. P. Hale. Space 814.

Celotex Company, The, Chicago.—Celotex insulating cane board for general railroad construction and for insulation of refrigerator cars and steel passenger cars. Represented by J. H. Bracken, J. H. Thomas, Harold Knapp, D. J. Carmouche, P. J. Halpin and H. A. Wilandy. Spaces 323 and 325.

Chase & Company, L. C., Boston, Mass.—Chase Velmo mohair velvets; new grains and colorings of Chase Leatherwove; upholsteries of modern decorative colorings and patterns. Represented by Eldon R. Campbell, H. T. Wight, D. P. Underhill and G. E. Sawyer. Spaces 47 and 49.

Chicago-Cleveland Car Roofing Company, Chicago.—Climax flexible all-steel roof; Viking rigid type all-steel roof; National flexible outside metal roof; Zenith flexible all-steel replacement type roof; Relco uncoupling device; Seal Tite journal box lid with inner seal; sections of loading devices for all steel roofs. Represented by C. D. Jenks, J. L. Stark and E. R. Swanson. Spaces 274 and 329.

Chicago Pneumatic Tool Company, New York.—Pneumatic tools; hose couplings; direct and alternating current electric tools; Hisevel tools; hoists; grinders; demolition tools. Represented by H. R. Denbel, L. F. Duffy, S. A. Congdon, Jr., D. E. Cooke, H. G. Barbee and E. R. Lynch. Spaces 146 and 201.

Chicago Railway Equipment Company, Chicago.—"Creco" and "Drexel" brake beams; "Creco" brake beam supports of the "third point" and "four point" types; "Economy" brake beam safety guard; "Creco" bottom rod guard; "Creco" ball bearing car doors; "Creco" roller side bearings. Represented by E. B. Leigh, F. T. DeLong, F. R. Carlson, E. G. Busse, A. C. Moore, G. N. Van Sweringen, H. M. Van Sweringen and E. A. LeBeau. Spaces 402, 404 and 406.

Clark Manufacturing Company, Philadelphia, Pa.—Smith Multiplex pressure devices. Represented by H. J. Smith and W. B. Clark. Space 10-A.

Clark Tructractor Company, Battle Creek Mich.—Four-wheel, gas-propelled tractor; three-wheel, gas-propelled tractor (operating); Clarkton gas-propelled boom crane with winch; Clark three-ton lift truck, gas-propelled; Clark two-ton wood top trailer. Represented by R. T. Burrows, A. S. Rampell and Karl Pfistner. Spaces 710, 711, 712, 713, 714 and 715.

Cleveland Tanning Company, The, Cleveland, O.—Upholstery leathers of all kinds. Represented by William G. Plumer, S. W. Midgley, Ray Preikschat and Harold M. Hill. Space 5.

Coffin, Jr., Company, The, J. S., Englewood, N. J.—Coffin feed water heater system. Represented by J. S. Coffin, Jr., R. P. Peckett, Jr., Paul Willis, E. L. Schellens, C. W. Wheeler, W. T. Cromley and T. C. Browne. Spaces 32 and 103.

Consolidated Ashcroft Hancock Company, Inc., New York.—Safety valves; gages, inspirators; check, globe and angle valves; whistles; miscellaneous locomotive steam specialties. Represented by H. D. Carlton, W. H. Williston, C. L. Brown, J. Soule Smith, W. J. Hall, P. H. Ryan, J. H. Bush and L. M. Pearsoll. Spaces 244, 246, 299 and 301.

Consolidated Machine Tool Corporation, Rochester, N. Y.—Reception booth. Represented by Alfred Trosch, H. M. Bowman, A. E. Ingle and W. C. Ingle. Space 10-D.

Coppus Locomotive Equipment Company, Worcester, Mass.—Coppus Locoblow, a motor driven blower to draft engines in roundhouses. Represented by Frans H. C. Coppus and Henry Gardner. Spaces 705 and 707.

Corley-DeWolfe Company, Elizabeth, N. J.—Corley ground joint unions; male and female unions; union elbows; union tees; air pump reservoir unions. Represented by R. A. Corley, H. E. Corley, H. N. Corley and D. F. McCarthy. Space 84.

Crane Company, Chicago.—Locomotive valves; locomotive fittings; Pullman-coach and de luxe lavatories. Represented by S. B. Jordan, F. W. Venton, J. C. Cole, E. L. Rutherford and H. S. Bartlett. Spaces 354, 356, 358 and 360.

Credit Monthly, New York.—Magazines. Space 789.

Crosby Steam Gage & Valve Company, Boston, Mass.—Locomotive safety valves; locomotive screwed tube gages; duplex gages; whistles; gage testing apparatus; globe valves; wheel press recorders. Represented by A. W. Lenderoth and F. H. Breor. Space 118.

Davis Brake Beam Company, Johnstown, Pa.—Brake beams; Davis four-point brake beam supports and safety arms; Security underconnection guards; pressed steel journal box lids meeting latest A. R. A. specifications. Represented by C. K. Stillwagon, C. F. Perkins and George W. Fox. Space 153.

Dayton Pneumatic Tool Corporation, The, Dayton, O.—New Dayton and Champion riveters; Bull Dog safety nail driver; new Dayton chipping hammers; Bull Dog rivet buster; new Dayton light riveting hammers; rivet sets; chisels; Dayton quick-acting universal hose connections. Represented by W. B. George and E. C. George. Space 736.

Dearborn Chemical Company, Chicago.—Reception booth. Represented by Robert F. Carr, George R. Carr, E. C. Brown, William Kinney, Charles M. Hoffman and Roger Q. Milnes. Spaces 218, 220 and 259.

Delaware & Hudson Railroad Corporation, The, Albany, N. Y.—Locomotive, road number 651. Represented by G. S. Edmonds, H. G. Becker, George Brown, L. Novy, J. Kirchhof, Robert Trimble and William Quinlan. Space on track.

Delta File Works, Philadelphia, Pa.—Files; rasps; file testing machine. Represented by A. L. Brow, W. S. Walsh, S. L. Hagar and F. P. Green. Space 120.

Detroit Lubricator Company, Detroit, Mich.—Detroit model A and model B mechanical lubricators; Detroit automatic flange oiler; Detroit Bullseye hydrostatic lubricator; Detroit transfer filler; Detroit automatic oil feed reducer. Represented by George E. Cage, S. A. Witt, E. M. Milbank, W. D. Knox, C. E. Sperry, A. G. Machesney and C. C. King. Space 373.

DeVilbiss Company, The, Toledo, Ohio.—Spray-painting and spray-finishing equipment for maintenance and production painting and finishing; portable air compressing outfits; material containers; spray guns; working model of DeVilbiss Canopy type exhaust. Represented by E. G. Whitmore, J. W. Savage and George R. Cooke. Space 89.

DeWalt Products Corporation, Lancaster, P.—DeWalt Wonder Worker; Wodack electric hand saw; timber dapping machines. Represented by Edward J. Gray, W. Ross Stevens and Herbert Gardner. Space 810.

Dick Company, A. B., Chicago.—New Formograph process of producing condensed reports, statements, etc., of all kinds; automatic feed mimeograph with new interleaver, No. 77-A mimeograph; portable mimeographs; Mimeotype and Cellotype stencil papers; screen plates for shading and backgrounds; standard and portable Mimeoscopes. Represented by Edmond I. Foley. Space 774.

Diehl Manufacturing Company, Elizabethport, N. J.—Diehl positive drive for railway car generators; railway car fans. Represented by Daniel Woodhead, Frank B. Williams, Jr., W. C. Straub and M. W. Buchanan. Space 98.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Dixon's Pure Flake lubricating graphites and graphite greases for special purposes; triple valve graphite; brake cylinder lubricant; engine front finishes; graphite curve and track grease; graphite pipe joint compounds; cup greases; silica; graphite paints; red lead primer; aluminum graphite paints. Represented by J. M. Willitts, R. E. Mitchell, J. J. Tucker, H. A. Nealley and Fred Speer. Space 116.

Dri-Steam Valve Sales Corporation, New York.—Locomotive throttle valves; standard Dri-Steam valves; reducing Dri-Steam valve; locomotive shut-off valves; non-return Dri-steam valves. Represented by Albert DeChiara, J. H. Nash, Sr., A. L. Rhodes and A. Wegman. Spaces 676 and 678.

Dromgold & Glenn, Chicago.—D & G brine tank openings; D & G brine tank valves; D & G door post pockets; D & G hatch linings. Represented by Howard A. Glenn and Loy S. Dromgold. Space 121.

Duff-Norton Manufacturing Company, The, Pittsburgh, Pa.—New Duff-Norton air motor-operated power jack; new Duff-Norton one-man empty car jack; Norton self-lowering screw jack; Duff governor-controlled self-lowering screw jack; Norton standard speed bridge and wrecking jacks; Duff and Norton journal jacks; Barrett trip or track jacks; Barrett automatic lowering jacks. Represented by C. N. Thulin, E. E. Thulin, H. J. Wilson, O. L. Wright, Albert Roberts, David F. Evans and W. G. Robb. Spaces 68, 70, 125 and 127.

Durametallic Corporation, Kalamazoo, Mich.—Durametallic packing in sets for reverse gear, air pump, valve rod, throttle, and in strips for cab cock packing; Dura Plastic for general use about locomotives and power plants; Durametallic packing for general use in power plants and mill work. Represented by J. J. McQuillen and Herbert Lewis. Space 82.

Ebinger Sanitary Manufacturing Company, D. A., Columbus, O.—Sanitary toilet and wash room equipment. Represented by J. R. Beckett and A. E. Smith. Space 90.

Economy Engineering Company, Chicago.—Ecoromy electric telescoping portable elevators; Red rocker barrel stand; models of steel barrel racks and lifters for oil warehouses. Represented by E. W. McDonnell, T. R. Tordoff and Stuart M. Conant. Space 684.

Economy Metal Products Corporation, Ogdensburg, N. Y.—Chromite heat resisting steel grate bars. Represented by A. H. Coplan, O. B. Capps and Thomas F. Wilson, Jr. Space 761.

Economy Railway Appliance Company, Ltd., Montreal, Que.—Economy tender water level indicator; Economy ice and snow cutter for application to Jordan spreaders. Represented by W. A. McCallum. Space 706.

Edgewater Steel Company, Pittsburgh, Pa.—Locomotive tires; rolled steel wheels; Edgewater ring spring draft gears. Represented by W. V. D. Wright, J. H. Baily, D. W. McGeorge, L. O. Cameron, E. A. Thornwell, J. H. Jerry, Jr., Scott Donahue, C. H. Sherburne and H. T. Tierney. Spaces 336, 338 and 340.

Edison Storage Battery Company, Orange, N. J.—Display board; cutaway cells; tray of car lighting cells. Represented by J. L. Hays, H. S. Peck, F. V. McGinness, H. W. Stortz, D. B. Mugan, W. F. Kiesel, III. Space 369.

Edna Brass Manufacturing Company, The, Cincinnati, O.—EF water column; gage with top cock; feed water check; oil burner; automatic lubricators; operating valve; operating cylinder and cylinder cock; model 1930 force-feed lubricator; coal sprinkler; fire extinguisher; K and KM air manifolds; guide terminal checks; terminal valve type T; flange oiler; sectional lubricator. Represented by William Beck, R. B. Buram, E. O. Corey, L. S. Dromgold, H. A. Glenn, D. B. Joseph, B. I. Kaufmann, E. F. O'Connor, C. B. Randall, W. E. Snyder, F. S. Wilcoxen and W. W. Fetner. Spaces 62 and 64.

Edson Manufacturing Corporation, South Boston, Mass.—Edson type "MU" power force pump; hand-operated Edson force pumps; Edson patented diaphragms for both hand and power pumping units. Represented by F. M. Weymouth. Spaces 313 and 315.

Edwards Company, Inc., The O. M., Syracuse, N. Y.—Brass sash; sash locks; top, bottom and side weatherstrip; trap doors; steel office furniture; padlocks. Represented by Harold Edwards, J. J. Edwards, T. W. Holt, C. H. Rockwell, T. W. Heaton, H. A. Cronmiller, T. P. O'Brien and G. B. Allison. Spaces 177 and 179.

Electric Arc Cutting & Welding Company, Newark, N. J.—Motor generator arc welders; gas engine driven arc welders; combinations of motor and gas engine driven arc welders; transformer arc welders; hydrogen flame arc welders; combination of transformer and hydrogen flame arc welders. Represented by John E. Gunning. Space 650.

Electric Journal, Brooklyn, N. Y.—Magazines. Space 811.

Electric Service Supplies Company, Philadelphia, Pa.—Keystone turbogenerators; Golden Glow locomotive headlights; new Golden Glow prefocused reflectors; new Keystone portable lamp guards; Golden Glow tender lights; Keystone headlight switches; Golden Glow floodlight projectors; Crystal valve power lightning arresters, Crystal valve signal lightning arresters. Represented by C. J. Mayer, A. H. Englund, M. A. Berg, H. J. Graham, H. G. Lewis, J. R. McFarlin, E. B. Hallman, I. W. Schmidt, J. L. Canby and L. B. Gawthrop. Spaces 298 and 371.

Electric Storage Battery Company, The, Philadelphia, Pa.—Exide batteries; Exide Ironclad batteries for railway, industrial truck and bus service. Represented by A. N. Dingee, L. R. Lighton, H. E. Hunt, H. B. Crantford, R. L. Baird and E. H. Watkins. Space 113.

Electro-Chemical Engineering Corporation, Chicago.—"Gunderson Process" equipment for the electro-chemical prevention of pitting, grooving, and general corrosion in boilers, feedwater heaters, etc.; "Gunderson Process" protected and ordinary unprotected boiler tubes and sheets to show corrosion prevention; model boiler demonstrating effect of "Gunderson Process" electric current on boiler water and metal; Foammeter for determining concentration of foaming salts in boiler water. Represented by O. W. Carrick. Space 328.

Electro-Motive Company, The, Cleveland, O.—60-ton gas-electric switching locomotive. Represented by H. L. Hamilton, O. F. Brookmeyer, Paul R. Turner, C. A. Sattley and R. M. Dilworth. Space 187 and on track.

Elliott Company, Jeannette, Pa.—Tube cleaners for use in boilers and arch tubes. Represented by H. A. Pastre, T. F. Crawford and H. J. Rolfe. Space 702.

Elwell-Parker Electric Company, The, Cleveland, O.—Heavy duty portable electric crane; low lift and high lift trucks for stores departments, freight houses, car and locomotive shops, etc. Represented by Lucian C. Brown, George W. Brown, H. G. Hansen, G. C. Isbester, A. H. Dobler, R. L. Smith, G. E. Kent, F. B. Neely, C. B. Cook and W. G. O'Brien. Spaces 418, 420 and 422.

Enterprise Railway Equipment Company, Chicago.—Door mechanisms for gondola and hopper cars; door hingebutts; photographs; 70-ton hopper coal car; 70-ton multi-service ballast car; 55-ton general service gondola car; 50-ton all-steel automobile box car. Represented by Argyle Campbell, Richard T. Coyne, George B. Dorey, Walter L. Gunnison and A. E. Zimmer. Spaces 374 and 376 and on track.

Equipment Specialties Company, Chicago.—Railway refrigerator car specialties including all-metal bulkheads and ice grates, well traps, drain spouts and flush floor rack holders. Represented by L. L. Cohen and George A. Hull. Space 311.

Everlasting Valve Company, Jersey City, N. J.—Everlasting tender tank valve, outside and inside types; Everlasting blow-off cocks for locomotive boilers; Everlasting valves for stationary boiler equipment; Flatplug valves for roundhouse service lines. Represented by John H. Allen and Edward N. Corning. Space 139.

Ewald Iron Company, Louisville, Ky.—Staybolts; staybolt iron, engine bolt iron; hammered iron forgings. Represented by J. P. Bourke, W. R. Walsh and G. O. Boomer. Space 225.

Falls Hollow Staybolt Company, Cuyahoga Falls, O.—Hollow and solid staybolt iron; hollow and solid side-wall bolts; hollow and solid crown and radial stays; hollow back flue sheet braces. Represented by C. M. Walsh, E. J. Raub, J. T. Doyle and Thomas Carlwell. Space 33.

Fate-Root-Heath Company, The, Plymouth, O.—Model of gas-electric 50-ton Plymouth locomotive. Represented by E. W. Heath, G. H. Fanning and L. R. Beatty. Space 786 and on track.

Firebar Corporation, Cleveland, O.—Firebars—a sectional locomotive grate. Represented by M. J. Bernet, J. J. Byrne, H. C. Huston, E. G. Hollister, R. G. Kelley, J. S. Thompson, M. P. Van Woert and Robert Watson. Space 14-A.

Flannery Bolt Company, Pittsburgh, Pa.—NuTate flexible staybolts; Flannery telltale flexible staybolts; Flannery two-piece flexible staybolts; installation tools; inspection tools for staybolts; Flannery electrical contact staybolt tester; rigid and crown staybolts. Represented by J. Rogers Flannery, E. S. FitzSimmons, E. G. Flannery, W. M. Wilson, E. J. Reusswig, John H. Murrian, James A. Murrian, L. Finegan, F. K. Landgraf, G. R. Greenslade and B. C. Howard. Spaces 106 and 161.

Flexible Truck Corporation, Reading, Pa.—Taylor flexible trucks for freight cars, locomotive tenders and passenger cars. Represented by H. D. Taylor, J. William Jost, Jr., and Howard Stull. Spaces 716, 717, 718, and 719 and on track.

Foote Brothers Gear & Machine Company, Chicago.—Gear drive for electric car lighting. Represented by George R. Berger and M. R. Shedd. Space 698.

Ford Sales Company, The, J. B., Wyandotte, Mich.—Wyandotte cleaning specialties; special features for application of cleaners. Represented by W. P. Scott, W. M. Cole and B. N. Goodell. Space 193.

Fort Pitt Malleable Iron Co., Pittsburgh, Pa.—Reception booth. Represented by Frank J. Lanahan, Joseph H. Kummer and E. H. Holmes. Space 151.

Franklin Railway Supply Company, New York.—Automatic fire door No. 8 Butterfly type; type E Franklin power reverse gear; Franklin sleeve joint; automatic adjustable driving box wedge; McLaughlin flexible conduit; limited cut-off; Franklin driving box lubricator; type F precision power reverse gear; power grate shaker. Represented by J. S. Coffin, S. G. Allen, H. F. Ball, W. H. Coyle, H. M. Evans, J. L. Randolph, W. T. Lane, S. D. Rosenfelt, James McLaughlin, R. F. DeMott, T. P. Whelan, Paul Weiler, T. L. Reed, F. M. Ball, J. A. Talty, C. W. F. Coffin, C. J. Buck and M. H. Roberts. Spaces 166, 168, 170, 172, 213, 215 and 217.

Frost Railway Supply Company, The, Detroit, Mich.—Frost friction truck springs; Harvey friction draft springs. Represented by Harry W. Frost, George A. Cooper, Harry W. Frost, Jr., and J. A. Boyden. Space 226.

Galena Oil Corporation, New York.—Reception Booth. Represented by George L. Morton, W. A. Trubee, R. P. Birtcil, R. J. McQuade, D. L. Eubank, J. S. Brown, W. J. McGee, J. C. O'Connor, H. H. McIlhenny, L. K. Morrison and N. E. Sprowl. Spaces 255 and 257.

Garlock Packing Company, The, Palmyra, N. Y.—Railroad and industrial mechanical packings of rubber, asbestos, duck, cotton, flax, shredded metal and metal; molded rubber and asbestos goods. Represented by George L. Abott, Phil Arnold, H. A. Clark, L. P. Duggan, J. H. Dunlevy, P. J. Hinkle, P. D. Miller, R. W. Perkins, H. J. Ramshaw, H. M. Sweetin, E. A. Tolley and F. L. Wallace. Spaces 414 and 416.

General American Car Company, Chicago.—Tank car devices; moving pictures of standard and special railway cars. Represented by LeRoy Kramer, O. J. Parks, J. S. Acworth, W. E. Geddes and R. W. Thompson. Space 171.

General Cable Corporation, New York.—Wires and cables. Represented by J. H. Side, F. N. Wardwell and F. O. Hoyt. Spaces 686 and 688.

General Electric Company, Schenectady, N. Y.—Educational display of research laboratory products; New York Central oil-electric battery locomotive for La Salle St. Station, Chicago. Represented by W. J. Hedley, B. S. Pero, J. B. Cox, E. E. Kimball, H. L. Andrews, W. A. Woolford, F. P. Jones, Jr., J. J. Liles, J. A. Boers, C. Dorticos, C. C. Peirce, R. F. Coggin, F. A. Kroner, Lynn Covey, P. M. Gillilan and C. C. Bailey. Space 7 and on track.

General Steel Castings Corporation, Eddystone, Pa.—Models of Commonwealth cast steel locomotive bed with cylinders integral, drop coupler pilot, two and four-wheel outside journal engine trucks, four-wheel inside journal engine trucks, two- and four-wheel "Delta Type" trailer trucks, ash pan, water-bottom tender frame, six-wheel tender trucks, pilot beam and pilot; underframe for passenger train cars including vestibule and blind-end platforms with upright end-frames, six-wheel straight equalizer outside side bearing truck; six-wheel bottom equalizer outside side bearing truck; six-wheel straight equalizer inside side bearing truck; four wheel express refrigerator car truck; four wheel electric railway motor truck; freight car underframe and trucks. Represented by Robert H. Ripley, W. O. Ashe, A. S. Blagden, H. R. Bartell, C. E. Fuller, Jr., H. Hoblitzelle, George E. Howard, E. G. Hallquist, P. R. Keller, A. E. LeGare, J. A. McCormick, H. M. Pflager, C. S. Shallenberger, W. M. Sheehan, R. A. Sherman, C. P. Whitehead, A. C. Wintemberg and P. O. Wood. Spaces 162, 164, 209 and 211.

Giessel Company, Henry, Chicago.—Drinking fountains; water coolers; filters for drinking water. Represented by Arthur W. Barth, S. W. Midgley, Ray Preikschat, Ross F. Hayes and Carl H. Kadie. Space 5.

Gilg, Henry F., Pittsburgh, Pa.—Gilg valve for washing and filling boilers; samples of radial stays; test specimens of Dunkirk rolled hollow staybolt steel. Represented by Henry F. Gilg. Space 417.

Globe Steel Tubes Company, Milwaukee, Wis.—Seamless steel tubing and tubular products of stainless, nickel content, copper content, Armco, and common steels. Represented by F. J. O'Brien, J. W. Floto, R. R. Lally and J. M. Welles. Space 248.

Gold Car Heating and Lighting Company, Brooklyn, N. Y.—Heating system apparatus; ventilators for railway cars. Represented by Edward E. Gold, F. W. Dearborn, E. B. Wilson H. C. Poillon, Franklin H. Smith, H. W. Dillon, H. B. Ackerman, B. L. Belknap, A. D. Stuver, Tom Moore, E. L. Barr, J. O. Brumbaugh, R. Van Keegam, V. A. Osborne and E. W. Balentine. Spaces 236 and 291.

Goodrich Rubber Company, The B. F., Akron, O.—Reception booth. Represented by E. A. Bedell, B. F. Moffatt, A. R. Miller, Frank Flavell, F. W. Wocher and A. B. Peacock. Space 36.

Goodyear Tire and Rubber Company, Inc., The, Akron, O.—Reception booth. Represented by W. T. Bell, C. W. Sullivan, J. B. Tilley and C. R. Weaver. Space 109.

Gould Coupler Company, The, New York.—See The Symington Company.

Graham-White Sander Corporation, Roanoke, Va.—Graham-White self-cleaning locomotive sanders; Graham-White automatic sanders for booster equipped trailer wheels; Graham-White remotely controlled sander valves for multiple units and for sanding at long range; Graham-White sand spreaders for moving sand to sandbox outlets. Represented by James Frantz, W. L. Ranson, W. H. White, F. H. Smith and Floyd D. Munn. Space 290.

Graphol Products Company, Inc., Brooklyn, N. Y.—"Graphol," a liquid combination of oils, Ceylon (air-floated) graphite, and chemicals, primarily intended for the cutting, absorption, elimination and subsequent prevention of rust and corrosion and all gummy or retarding deposits. Represented by Aubrey Love and James A. Burton. Space "H."

Griffin Wheel Company, Chicago.—Chilled tread car wheels. Represented by A. A. Hale, I. L. Grant, F. L. Whitcomb, Jr., F. B. Flinn, C. G. Melvin, C. P. Whitcomb and George Acker. Spaces 34 and 105.

Grip Nut Company, Chicago.—Grip Nut Company products. Represented by W. E. Sharp, L. W. Kass, J. H. Sharp, J. L. Logan and W. E. Weatherford. Spaces 264 and 319.

Hagy Waste Works, The J. Milton, Philadelphia, Pa.—Machinery wiping rags; wiping waste; journal box packing waste. Represented by J. Milton Hagy, H. P. Ogden, Charles H. Wigo, James Milloy and R. L. Nutt, Jr. Space "G."

Hale & Kilburn Company, Philadelphia, Pa.—Chairs and seats for de luxe and standard main line coaches, suburban coaches and gas rail cars. Represented by W. M. Swope, R. F. Stubblebine, R. O. Young, H. B. Gengenbach, W. J. Clair. Spaces 394, 396, 398 and 400.

Hanlon Drifting Valve Company, Boston, Mass.—Working model of semi-automatic drifting valve. Represented by William J. Hanlon and John W. Hanlon. Space 326.

Hanlon Locomotive Sander Company, Winchester, Mass.—Working model of sand box; improved type of track sanders; three types of Bull's-Eye water gages. Represented by William J. Hanlon and John W. Hanlon. Space 409.

Hanna Stoker Company, The, Cincinnati, O.—Working model of locomotive stoker. Represented by W. T. Hanna, S. K. Witt, C. D. King and W. L. Wise. Space 165.

Hennessy Lubricator Company, New York.—Mechanical lubricators for locomotive engine truck journals, driving journals, outside and inside bearing trailer journals and A. R. A. journals. Represented by J. J. Hennessy and W. Edgar Hamsher. Space 411.

Hertzler & Zook Company, Belleville, Pa.—Photographs of machine tools equipped with individual motor drives. Represented by I. Z. Hertzler, R. W. Wilson, S. B. Yoder and F. Ray Dulaney. Space 785.

Heywood-Wakefield Company, Boston, Mass.—Coach seats; suburban car seats; smoking car seats; motor coach seats. Represented by J. V. Conway, T. D. Owler, Bertram Berry, C. E. Preble, G. W. Vennels, W. E. Foreman, A. F. McLachlin and George E. Cornwall. Spaces 130, 132, 134 and 136.

Hollup Corporation, Chicago.—Welding machine; welding wire, welding cable; welding accessories; welding panel; welding specimens. Represented by Charles F. Palmer and George O. Rohder. Space 648.

Houghton & Company, E. F., Philadelphia, Pa.—Reclamation of railway elliptic springs; track tools; shop tools; cleaning of air pumps; metal working products for railroad shops; lubrication and power transmission of shop machinery. Represented by George W. Pressell, Walter A. Buechner, J. Coleman Bentley, T. L. Holland, C. G. Schultz, D. E. Williard, H. C. Finck and M. Schultz. Spaces 775, 777 and 779.

Hulson Grate Company, Inc., Keokuk, Iowa.—Hulson locomotive grates with straight draft and tuyere type grate surface. Represented by A. W. Hulson, J. W. Hulson, H. N. Gardner and E. E. Bergman. Spaces 754 and 756.

Hunt-Spiller Manufacturing Corporation, South Boston, Mass.—Locomotive frictional parts of Hunt-Spiller air furnace gun iron subjected to service under superheated steam and otherwise, including cylinder bushings, cylinder bull rings and pistons, cylinder packing rings, piston valve bushings, piston valve bull rings, piston valve packing rings, crosshead shoes, pedestal shoes and wedges, hub liners, dry pipe elbows and sleeves, dry pipe joint rings, etc.; brake drums for automotive trucks and buses. Represented by J. G. Platt, V. W. Ellet, F. M. Weymouth, E. J. Fuller, E. C. Felton, R. F. Harrington, A. B. Root, Jr., F. W. Lampton, D. F. Hall, F. B. Hartman, C. L. Galloway, L. O. Arringdale, B. B. Mills and E. E. Clark. Spaces 258 and 260.

Hutchins Car Roofing Company, Detroit, Mich.—Universal dry lading all-steel roof; channel steel end. Represented by J. T. Martyn, J. F. Comee, S. L. Beymer, W. D. Thompson and A. R. Wilson. Space 182.

Hutto Engineering Company, Detroit, Mich.—Hutto model MJ machine for grinding bores of compound air pumps, booster cylinders, brake cylinders, reverse gear cylinders, etc.; Hutto model MO machine for grinding firedoor cylinders, knuckle pin bushings, valve crosshead bushings, etc.; Hutto grinders and drive heads. Represented by C. A. Dunn, J. W. Hindes, James G. Young, Jack Navin and C. D. Smith. Space 658.

Hyatt Roller Bearing Company, Newark, N. J.—Wheel and axle unit operating on two Hyatt roller bearing journal boxes; latest type journal box completely disassembled; turntable box and bearing; collection of railroad type bearings in various sizes. Represented by H. J. Forsythe, H. O. K. Meister, H. K. Porter, C. A. Johnson, J. W. Wiley, V. N. Delamater, R. J. Brittain, and O. W. Young. Spaces 419, 421 and 423.

Hynson, Westcott & Dunning, Baltimore, Md.—Mercurochrome antiseptic and disinfectant for wounds and burns in solution, water-soluble powder and tablet forms; demonstrations of applications and results. Represented by W. Rodney Burton, William R. Poole, Wade Sampson and Charles P. Duncan. Spaces 672 and 674.

Illinois Steel Company, Chicago.—Wheels; axles; car building sections; floor plates; rails; tie plates; track spikes; track bolts and nuts. Represented by O. H. Baker, C. B. Friday, N. M. Hench, C. R. Moffatt, John Brunner, R. G. Glass, F. S. Crane and Grant Monk. Spaces 184, 186 and 188.

Independent Pneumatic Tool Company, Chicago.—Thor high frequency electric drills, reamers, tappers, screw drivers, nut setters, grinders and sanders; Thor rotary pneumatic drills, reamers, wrenches, grinders and sanders; chipping hammers; riveting hammers; rivet buster; holderson; Thor Universal electric drills and reamers. Represented by R. S. Cooper, R. T. Scott, A. Anderson, R. E. Kelly, W. A. Nugent and J. P. Fletcher. Spaces 129 and 131.

Industrial Brownhoist Corporation, Cleveland, O.—Illustrations of gasoline, Diesel and steam locomotive cranes, wrecking cranes, ballast cleaning machines, and ditchers. Represented by G. L. Harman, James Shearer, W. L. Brown, C. H. White, Max Riebenack and G. F. Climo, Jr. Space 86.

Ingersoll-Rand Company, New York.—Air compressor; three and four-cylinder type pneumatic drills; close quarter drills; riveting hammers; rivet buster; chipping and calking hammers; piston-type and multivane grinders; safety-first air saws; sand rammers; air motor hoists. Represented by George A. Gallinger, Fred M. Cross, W. A. Johnson, D. W. Zimmerman, J. F. Kroske, G. C. Kehrer and R. W. Bailey. Spaces 384, 386, 388, 390 and 392.

Insulite Company, The, Minneapolis, Minn.—Small models showing applications of thermal insulation to refrigerator cars and storage tanks. Represented by D. D. Grassick and A. J. Frost. Space 268.

International Nickel Company, Inc., The, New York.— Typical applications of nickel and nickel alloys in the railroad field. Represented by C. McKnight, F. B. Coyle, W. C. Kerrigan, H. S. Lewis, A. L. Roberts, T. H. Wickenden, R. Cooper, Jr. and E. J. Bothwell. Spaces 85 and 87.

Irving Iron Works Company, New York.—Irvico Safkar steps for passenger coaches and cabooses; brake steps; running boards for box cars and cabooses; tank car running boards and dome platforms; locomotive running boards and steps; steps for tenders; Duralumin passenger coach steps; sectional highway crossing; Irving open steel flooring and as "Armoring" showing the "Continuity" jointless floor for freight station platforms, shops, etc. Represented by Linson H. De Voe and William Noblett. Spaces 758 and 760.

Isothermos Corporation of America, New York.—Journal boxes, bearings and accessories. Represented by Norman Chivvis, S. W. Crawford, William H. Bies, George W. Wilson, A. N. Dugan and A. H. McMahan. Space 29.

Johnston Manufacturing Company, Minneapolis, Minn.—Four styles of Johnston reverse blast burners; Johnston automatic control (operating); section of Johnston non-clog burner; Johnston No. 373 tire heater; Johnston No. 39 kindler; Johnston automatic shut off valve. Represented by H. A. Anderson. Space 88.

Johnston Manufacturing Company, Minneapolis, Minn.—Vacuum type locomotive fire kindler; vacuum type locomotive tire heater; reverse blast low pressure oil and gas burner; non clogging vacuum oil burner; "Positive Oil Feed" automatic control. Represented by H. A. Anderson, H. L. Burrhus and J. R. Matthews. Space 88.

Jones & Laughlin Steel Corporation, Pittsburgh, Pa.—Car sections; tie plates; spikes, piping, junior beams; lightweight channels, pipe; cold finished steel. Represented by Herbert J. Watt. Spaces 173 and 175.

Joyce-Cridland Company, The, Dayton, O.—Complete line of lifting jacks. Represented by O. H. Sneed, C. H. Brown, Harry Brock, C. L. Bunnell and A. S. Beattys. Spaces 322, 324, 405 and 407.

Keller, Inc., William H., Grand Haven, Mich.—Pneumatic tools. Represented by Guy S. Warren, Ernest Shaff, J. C. Campbell, W. E. Hall and J. B. Corby. Space 10-E.

Kerite Insulated Wire & Cable Company, The, New York.—Reception booth. Represented by J. A. Renton. Space 145.

Key Bolt Appliance Company, Elmira, N. Y.—Special key bolts for fitting up work. Represented by R. H Peters. Space 330.

Keyoke Railway Equipment Company, Chicago.—Peerless Hylastic steel friction draft gear; cast steel coupler yokes. Represented by Roy J. Cook, Belden D. Jones and C. C. Gaskins. Space 191.

Klasing Car Brake Company, Chicago.—Lever type hand brake; horizontal wheel hand brake; vertical wheel hand brake; box car with Klasing brakes. Represented by A. F. Klasing, W. B. McCullough and F. J. Stolpe. Space 10-B and on track.

Landis Machine Company, Waynesboro, Pa.—1-in. Landis automatic forming and threading machine; 4-in. Landis pipe threading and cutting-off machine; Landex heads; Landmatic heads; Lanco heads, Reverse taper heads; Victor taps. Represented by F. C. Delcher, C. N. Kirkpatrick, G. M. Stickell, J. A. Cover and J. I. Davis. Spaces 728 and 729.

Leavitt Machine Company, The, Orange, Mass.—Dexter valve reseating machines for reseating globe valves, gate valves and for refacing pump valve seats; Elesco exhaust steam injector reseating tools; reseating tools for Worthington feedwater locomotive heaters. Represented by E. S. Hersey. Spaces 683 and 685.

Lebanon Steel Foundry, Lebanon, Pa.—Electric furnace steel castings for locomotives, railway appliances and motor trucks; alloy stainless and heat-resistant steel castings. Represented by W. H. Worrilow, T. V. Blodgett, A. J. McDonald and P. E Gerhard. Space 413.

Lehon Company, The, Chicago.—Canvas and plastic car roofing; waterproof insulating and building paper; waterproof felt, fabrics and membranes; car paint; car cements and compounds; locomotive cab curtain canvas. Represented by Tom Lehon, E. A. Leonard, J. W. Shoop and F. T. Carpenter. Space 149.

Lewis-Shepard Company, Watertown, Mass.—Jacklift truck; Footlift truck; Skid shipping platform; stacker and barrel racks. Represented by J. E. Freeman and E. S. Powers. Space 700.

Libbey Glass Manufacturing Company, The, Toledo, O.—Libbey high pressure gage glasses; high pressure Red Line gage glasses; reflex glasses; Bulls-eye lubricator glasses; Super high pressure gage glasses. Represented by J. A. Carson and R. W. Rogers. Space 138.

Lima Locomotive Works, Inc., Lima, O.—Reception booth. Represented by J. E. Dixon, W. E. Woodard, W. H. Winterrowd, G. W. Alcock, W. B. Carnes and J. E. Long. Spaces 166, 168, 170, 172, 213, 215 and 217.

Lockhart Iron & Steel Company, Pittsburgh, Pa.—Vulcan Bloom staybolt iron; Vulcan XX engine bolt iron; Vulcan iron forging billets for use in the manufacture of locomotive draw and safety bars and passenger car equalizers. Represented by J. M. Gillespie and J. Porter Gillespie. Space 270.

Locomotive Finished Material Company, The, Atchison, Kan.—Special steel piston with combination Universal bull and packing rings; Universal sectional packing rings; Universal blow-off muffler; locomotive valve and cylinder packing rings; finished valve chamber bushings; miscellaneous rough steel castings. Represented by R. L. McIntosh, C. Hastings, E. J. Purcell and G. W. Taylor. Spaces 272 and 327.

Locomotive Firebox Company, Chicago.—Nicholson thermic syphon. Represented by George R. Carr, Walter S. Carr, R. A. Carr, George N. DeGuire, A. A. Taylor, L. R. Pyle, John Baker and C. M. Rogers. Spaces 308, 310, 391 and 393.

Logan Drinking Cup Company, Division of United States Envelope Company, Worcester, Mass.—Ajax paper drinking cups; Ajax cup dispensers, standard and special railroad models. Represented by Donald B. Logan and Francis P. Swallow. Space 10-C.

Long, Jr., Company, Charles R., Louisville, Ky.—Lacquer and paint panels. Represented by Charles R. Long, Jr., M. H. Oakes, Wiley B. Bryan, J. C. Weedon and Kenneth E. Clarke. Space 425.

Lower Stoker Company, Pittsburgh, Pa.—Locomotive stoker. Represented by N. M. Lower and J. B. MacKenzie. Spaces 731 and 733.

Lukens Steel Company, Coatesville, Pa.—24-in. thick gas-cut slab; samples of various steels produced or converted by Lukens Steel Company; test pieces of nickel boiler steel and silico-manganese boiler steel; locomotive firebox quality steel plate rolled from a 90,000-lb. ingot, plate 300 in. by 180 in. by 4 in. Represented by R. W. Wolcott, Frank H. Gordon, George L. Gordon, George A. Cardwell, Harry Loeb, J. Frederick Wiese, W. H. Warren, W. G. Humpton and L. P. McAllister. Spaces 174, 176 and on track.

Lunkenheimer Company, The, Cincinnati, O.—Valves; lubricators; oil and grease cups; other engineering appliances. Represented by K. B. Litzelman, W. George Cook, W. M. Hood and H. J. Evans. Space 107.

MacRae's Blue Book Company, Chicago.—Copies of MacRae's Blue Book. Represented by Thomas H. MacRae, Alex Smith, W. P. Dent, C. S. Wallace, A. Schlarbaum, F. O. Rice, Clyde Hill and Lloyd Simonson. Space "E."

Mack-International Motor Truck Corporation, New York.—45-ton Mack gas-electric locomotive; 60-ton Mack gas-electric locomotive. Represented by Edwin M. Post, Jr., C. S. Macdonald, Earl B. Hill and W. B. Jupp. Spaces 770 and 771.

MacLean-Fogg Lock Nut Company, Chicago.—M-F watertight bolts; lock nuts; nut locks. Represented by J. A. MacLean, J. W. Fogg, W. G. Willcoxson, L. R. Conolly, J. A. MacLean, Jr., and Aage Nilsen. Space 115.

Magnus Company, Inc., Chicago.—Reception booth. Represented by W. P. Carney, W. D. Hickey, G. A. Murphy and M. J. Turner. Space 96.

Manganese Steel Forge Company, Philadelphia, Pa.—Rol-Man rolled manganese steel pedestal and journal box wear plates; bolster and transom chafing plates for cars and locomotives; Rol-Man pins and bushings for brake service, etc. Represented by H. Howe. Space 92.

Manning, Maxwell & Moore, Inc. (Putnam Machine Works), New York.—Reception booth; photographs. Represented by Walter Deems and Jack Devlin. Spaces 244, 246, 299 and 301.

Mason Regulator Company, Boston, Mass.—New Mason reducing valve for car heating service; pressure regulating devices for power plant service. Represented by F. A. Morrison and N. P. Bates. Space "F".

Massachusetts Mohair Plush Company, Boston, Mass.—Mohair upholstery fabrics for de luxe coaches, club and observation cars. Represented by Henry M. Bliss, Austin B. Mason, William W. Melcher, S. W. Midgley and R. W. Preikschat. Space 5.

McConway & Torley Company, The, Pittsburgh, Pa.—Type "D" coupler, top operating; type "D" coupler, bottom operating; type "E" coupler, top operating; type "E" coupler, rotary bottom operating; Pitt pivoted passenger coupler equipment. Represented by I. H. Milliken, W. J. Regan, H. F. Dunbar, G. P. Ritter and Enoch George, Jr. Spaces 276, 278 and 280.

Mercedes Benz Company, Inc., New York.—Bus driven by Diesel motor; truck driven by Diesel motor; Diesel engine. Represented by E. Hailer. Space 624.

Messinger Bearings, Inc., Philadelphia, Pa.—Roller bearing car journal boxes; thrust roller bearing for turntables; roller bearing side bearings; hydraulic piston rod pusher; hydraulic bolt puller; hydraulic portable punches. Represented by Garrett F. Hom. Spaces 720 and 722.

Metal & Thermit Corporation, New York.—Thermit welding materials and specimen welds. Represented by H. D. Kelley and J. G. McCarty. Space 265

Micro Machine Company, Bettendorf, Iowa.—Model F. G. air pump grinder with attachments; model D. G. side-rod and valve motion grinder; Micro link grinding attachment; Micro portable crank-pin grinder; Micro portable frame-jaw miller. Represented by H. H. Yerk, H. H. Moor and H. T. Becke. Spaces 690, 691, 692, 693, 694, 695, 696 and 697.

Midgley & Borrowdale, Chicago.—Protecto weather seal lock strip; weatherproof window; Protecto weatherstripping. Represented by S. W. Midgley and Ray W. Preikschat. Space 5.

Midland Company, The, South Milwaukee, Wis.—No. 101 Midland door hanger; No. 1012 Midland combination door hanger and safety stop for baggage, express and mail car doors; No. 409 releasing device for door hangers; No. 27 Wilbern adjustable door hanger for baggage, express and mail cars; No. 315 Midland baggage car door hanger; No. 2 special Midland adjustable door hangers for warehouse, station and shop doors. Represented by R. A. Nourse and Howard P. Cook. Space 95.

Midvale Company, The, Nicetown, Philadelphia, Pa.—Locomotive tire; high speed tool steel; forged bushings. Represented by Stuart Hazlewood, H. E. Rowe, K. L. Ketcham, W. S. Edger, Charles F. Tietze, H. H. Ziesing, H. C. Myers and R. M. Bird. Space 365.

Milar, Clinch & Company, Chicago.—Continental car cement. Represented by Duncan L. Clinch, Karl A. Milar, C. H. Broo and A. W. Gillespie. Space 147.

Miner, Inc., W. H., Chicago.—Friction draft gears; friction buffing devices; spring draft gears; safety hand brakes; side bearings; refrigerator car door fasteners; bolster locking center pins. Represented by Albert P. Withall, George A. Johnson, W. E. Robertson, B. S. Johnson, G. Q. Lewis, J. H. Link, J. F. O'Connor, R. J. Miner, W. A. Heitner and A. E. Dentler. Spaces 30 and 101.

Morton Manufacturing Company, Muskegon Heights, Mich.—32 in. stroke high duty draw-cut shaper with overhead extension ram cap; special high duty draw-cut railroad shaper with crosshead planing attachment; 24 in. stroke stationary keyway cutter with direct connected reversing drive unit; journal bearing finishing miller; Robinson Red automatic air couplings. Represented by Henry E. Morton, H. Earl Morton, G. F. Goble, M. Frank Bliss and Matt. H. Morton. Spaces 666, 667, 668 and 669.

Murdock Manufacturing & Supply Company, The, Cincinnati, O.—Q. O. C. air valves; railway water service boxes; drinking fountains. Represented by J. C. Endebrock and J. C. Endebrock, Jr. Space 734.

Nathan Manufacturing Company, New York.—Injectors; lubricators; water columns; low-water alarms; boiler checks; whistles; valves. Represented by J. F. Farrell, R. Welch, F. C. Davern, R. H. Jenkins, O. Best, W. R. Walsh, William Harris, J. A. Kelly, C. J. Banning, J. T. Dohm and W. G. Lockwood. Spaces 331, 333 and 335.

National Aluminate Corporation, Chicago.—Nalco water motors; Nalco chemical proportioners for automatic wayside water treatment; sodium aluminate for water treatment; laboratory and field apparatus and equipment for water testing. Represented by P. W. Evans and H. A. Marshall. Space 31.

National Bearing Metals Corporation, St. Louis, Mo.—Locomotive wearing parts; car journal bearings; armature and axle bearings; babbitt metals and solders; side-oiling truck bearings; "Arctic" crown bearings; self-lubricating lateral plate; "Arctic" combination driver and lateral plate. Represented by Norman Chivvis, S. W. Crawford, William H. Bies, George W. Wilson, A. N. Dugan and A. H. McMahan. Spaces 19, 21, 23, 25, 27 and 29.

National Boiler Washing Company of Illinois, Chicago.—Motion pictures. Represented by Fred W. Gale. Space 66.

National Brake Company, Inc., Buffalo, N. Y.—Several types of Peacock geared hand brakes for freight and passenger cars; other types for locomotives. Represented by William M. Wampler, Frank D. Miller, C. A. Koenig, C. T. Stanfield and E. C. Mersereau. Space 44.

National Lock Washer Company, Newark, N. J.—National De Luxe windows; car window equipment. Represented by G. L. R. Masters, A. W. Preikschat and S. E. Blessin. Space 195.

National Malleable and Steel Castings Company, Cleveland, O.—ARA type "E" couplers; ARA standard "D" couplers; Traxo couplers; ARA cast steel yokes; National friction draft gears; journal boxes; roller bearing journal boxes; roller bearing truck complete, mounted on track; parts for type "E" couplers. Represented by T. W. Aishton, J. J. Byers, T. H. Doyle, G. R. Farrell, J. F. Hutson, C. H. Krakau, F. K. LeVake, W. C. Lewis, G. V. Martin, H. L. Mausk, C. H. McCrea, F. E. Moffett, Benjamin Nields, Jr., E. A. Powell, R. R. Root, E. H. Schmidt, E. V. Sihler, F. Snyder, E. O. Warner and L. S. Wright. Spaces 112, 114, 167 and 169.

National Railway Devices Company, Chicago.—Shoemaker Radial No. 2 fire door with additional features for automatically closing fire doors when cracked or wide open in case blow out occurs and automatically stopping train in case of all serious blowouts. Represented by E. J. Gunnison. Space 782.

National Tube Company, Pittsburgh, Pa.—Boiler tubes; superheater tubes; superheater pipe; copper-steel railway signal pipe; scale free pipe; copper-steel pipe and seamless pipe for locomotives and train lines; model showing Piercing process and various steps in manufacture of National seamless pipe and tubing. Represented by J. W. Kelly, P. J. Conrath, H. R. Redington, R. J. McAuliffe, J. E. Fleming, T. E. Conklin, C. W. Potter, W. L. Schaeffer and John M. Denney. Spaces 227, 229 and 231.

New York Air Brake Company, The, New York.—Sectional devices showing interior construction of compressor governor, feed valve, universal valve, triple valve, etc.; cadmium plated hose coupling; pedestal type brake valve; packing rings; single car tester. Represented by C. A. Campbell, J. D. Cartin, H. A. Flynn, Bert Hyanes, K. E. Kelling, George Kleifges, C. E. Leach, C. B. Leeser, N. W. Lyon, L. K. Sillcox, E. F. Wentworth and H. T. Wentworth. Spaces 180 and 223.

New York Central Lines, New York.—Drop side container car with six merchandise containers; brick container car with twelve brick containers. Represented by G. H. Ingalls, Jr., and H. G. Judd. Space on track.

Niles Tool Works Company, Hamilton, O.—90 in. quartering machine; 27 in. by 9 in. time saver lathe; No. 3 cotter and milling machine. Represented by G. A. Rentschler, J. E. Peterson, L. C. Cole, D. S. Woods, A. C. Wals, O. S. Ackley, P. C. McBeth, S. Matchett, J. Ross, W. R. Mullinix, B. A. Donahue, A. T. Kuehner and J. Fisher. Spaces 634 and 636.

Oakite Products, Inc., New York.—Demonstration of cleaning air pumps without dismantling with vaporized solutions of Okemco; demonstration of stripping paint from locomotive tenders by solution flow-on method with Oakite materials. Represented by H. L. Gray, L. B. Johnson, G. M. Seib, G. Gregory and H. E. Hurd. Space 93.

Ohio Brass Company, Mansfield, O.—Tight-lock ARA type coupler and train line connector, mounted on operative frame; welded signal bonds; catenary materials for electrification work; porcelain insulator for electrification work. Represented by A. L. Price, C. H. Tomlinson and D. H. Moore. Spaces 738, 740 and 742.

Ohio Injector Company, The, Chicago.—Mechanical lubricators; non-lifting injectors; flange oilers; fire jets; low water alarms. Represented by William S. Furry, Frank W. Edwards, C. G. Sauerberg and W. H. Malone. Space 296.

Ohmer Fare Register Company, Dayton, O.—Two types of railway ticket office printing machines; three types of ticket printing fare registers for motor buses; ticket printing registers for bus ticket offices; toll bridge fare registers; Ohmer recording instruments for motor vehicles. Represented by H. B. Ohmer, George F. Jacobs, R. T. Abrell, B. C. Palmer, R. M. Ohmer and R. L. Hubler. Space 670.

Okadee Company, The, Chicago.—"Okadee" blow off valve; water glass protector; atomizing lubricator; tender hose coupler, automatic cylinder cock; front end hinge, drain valves; cylinder safety valve; blow-off muffler. Represented by A. G. Hollingshead, J. M. Monroe, C. W. Ploen, G. P. Dirth and C. G. Learned. Space 317.

Okonite Company, The, New York.—Wires and cables for all kinds of railway service; special cables for aerial, underground and submarine service; Okonite and Manson tapes; varnished cambric and impregnated cables; paper super-tension cables; splicing materials. Represented by A. L. McNeill, L. L. King, J. D. Underhill, R. Baker, H. A. Hamilton and J. W. Hackett. Spaces 81 and 83.

Opco Company, Inc., Buffalo, N. Y.—Top cylinder lubrication and lubricant. Represented by E. W. Dinse. Space 776.

Oxweld Railroad Service Company, The, Chicago.—Reception booth. Represented by M. C. Beymer, G. P. Bogert, R. R. Browning, W. A. Champieux, Leslie Flood, F. C. Hasse, J. L. Hoffman, W. A. Hogan, R. R. Kester, A. N. Lucas, E. S. Richardson, J. H. Rodger, H. W. Schulze, J. G. Tawse, G. B. Walker, A. W. Whiteford and C. S. Wright. Spaces 377 and 379.

Paige & Jones Chemical Company, Inc., New York.—P-J wayside tank method of water treatment for locomotive boilers; P-J electro-magnetic proportioners for water softeners; P. J. Zeolite-rapid rate upward flow. Represented by C. B. Flint, F. O. Paige and R. E. Falkinburg. Space 10-F.

Paint Products Corporation, Philadelphia, Pa.—Method of application of Drion freight car paint; Drion refrigerator enamel and Drion stencilling paste. Represented by Henry C. Carpenter, A. Pierce Gregg and D. M. Davis. Space 140.

Pantasote Company, Inc., The, New York.—Pantasote curtain and seating materials; De Luxe curtain materials; Agasote headlining, wainscoting, ceiling and hoods; Three Star Agasote headlining, wainscoting, ceiling and hoods. Represented by William A. Lake, William Anderson, Harold H. Horn and H. G. Mastin. Spaces 362, 364 and 366.

Parker Appliance Company, Cleveland, O.—Parker tube couplings; Parker valves; Parker bending equipment and associated products. Represented by C. E. Klamm and W. F. Rapprich. Spaces 679 and 681.

Paulus & Company, Joseph C., Philadelphia, Pa.—Paulus oxy-acetylene cutting and welding equipment, including Cleancut guide portable hand cutting machine, combination cutting and welding set, rivet cutter, boiler tube cutter, hole piercer, oxygen regulators, acetylene regulators and hydrogen regulator; Paulus combination Anchor leather belting. Represented by Alfred E. Paulus. Space 772.

Paxton-Mitchell Company, Omaha, Neb.—Metallic piston rod, valve stem and air pump packing. Represented by L. J. McConnell, H. J. Molloy and J. J. Keliher. Space 148.

Pels & Company, Inc., Henry, New York.—All-steel 80-in. by 5/8-in. gate shear; combination punch, splitting shear and bar, angle and tee cutter, type MA-20 special; quadruple combination punch, splitting shear and bar, angle and tee cutter, with built-in notcher, type MAE-16; bar and billet shear, type FV-23. Represented by C. L. Martin, T. F. Kane and J. A. Weigand. Spaces 651, 653, 655 and 657.

Penn Iron & Steel Company, Creighton, Pa.—Samples of Lewis special staybolt iron, Lewis engine bolt iron and Lewis special seamless hollow drilled headed and threaded staybolts; iron furniture made from Lewis special staybolt iron, bent cold. Represented by Charles J. Nieman. Space 163.

Pennsylvania Railroad, The, Philadelphia, Pa.—Class Mla Mountain type locomotive with 21,000-gallon tender; 145-hp. gas-electric rail car; class P-70 deluxe passenger coach; class R-50b passenger train refrigerator car; class X-29 box car, 10,000 lb. capacity; class Fm, 40-ft. flat car, 100,000 lb. capacity, loaded with five double door containers for l. c. l. freight; class F-31, 63 ft. 6 in. flat car, 140,000 lb. capacity, loaded with eight double door containers for l. c. l. freight; class H-27 self-clearing hopper car, 190,000 lb. capacity; class H-21a self-clearing hopper car, 140,000 lb. capacity, with Timken inboard bearing; Timken locomotive and tender; class F-25b flat car with depressed center, loaded with large plates exhibited by the Lukens Steel Company; engine truck for freight locomotive, exhibited by the Timken Roller Bearing Company. Space on Pennsylvania R. R. tracks.

Permutit Company, The, New York.—Model of complete Permutit water softening equipment as installed on a railroad; typical installation of Permutit water softener; Ravarex CO_2 recorder in operation; tracings; flow diagrams of various installations. Represented by M. F. Corin, F. S. Dunham, F. D. Harger, W. H. Mitchell, H. M. Olson, D. J. Hess, W. L. Lowrie and J. R. Crocker. Spaces 576 and 577.

Pilliod Company, The, New York.—Baker locomotive valve gear. Represented by Frank H. Clark, J. J. Donovan, R. H. Weatherly, J. D. Purdy, H. B. Snyder and H. A. Kibby. Space 178.

Pilot Packing Company, Inc., Chicago.—"V" Pilot packing for air pumps, throttle stems, booster ball joints, reverse gear, etc.; asbestos listing; sheet packing; Pilot fibrous packing; cabcock packing; flue brushes; auxiliary tube cleaners. Represented by Joseph Sinkler. Space 352

Pittsburgh Plate Glass Company, Pittsburgh, Pa.—Carbide and other railway paint specialties. Represented by James G. Mowry, John E. Leonard and L. F. Theurer. Space 73.

Pittsburgh Steel Foundry Corporation, Glassport, Pa.—Pittsburgh lubricated center bearing bolster and body center plate. Represented by C. W. Howat, H. V. Seth, W. C. Eichenlaub, J. R. Forney, B. Haskel and John Allison. Space 7-B.

Pocket List of Railroad Officials, The, New York.—Reception booth. Represented by B. J. Wilson, Harold A. Brown and J. Alexander Brown. Space 60.

Powell Pressed Steel Company, The, Hubbard, O.—Corrugated steel skids or platforms; corrugated tiering boxes; four way skid boxes; crane boxes; welded crane box platforms; one-piece tote pans. Represented by H. S. Wylde, L. F. Milner and George E. Madden. Spaces 757 and 759.

Pratt & Letchworth Company, Buffalo, N. Y.—Malleable iron and steel castings; coil springs. Represented by Arthur M. Edwards. Spaces 30 and 101.

Pratt & Whitney Company, Hartford, Conn.—Small tools and gages. Represented by W. H. Gourlie, Harold Lucas, A. W. Cordonna and A. H. d'Arcambal. Space 97.

Pressed Steel Car Company, New York.—Reception booth. Represented by J. F. MacEnulty, N. S. Reeder, C. E. Postlethwaite, F. O. Schramm, H. H. Gilbert, C. C. Clark, M. C. Blest, F. L. Johnson, H. S. Hammond, J. G. Morrissey, W. H. Wilkinson, C. H. Jackman, C. P. Mapp and F. H. Freshwater. Spaces 150 and 152.

Prime Manufacturing Company, The, Milwaukee, Wis.—Alemite equipment for the lubrication of railway locomotives, cars, shop equipment, etc.; complete line of Prime products for locomotives. Represented by O. S. Prime, H. G. Wild, T. F. Going, N. J. Kamen, S. A. Kelly, C. K. Ramp and J. H. Karrow. Spaces 410 and 412.

Production Machine Company, Greenfield, Mass.—Automatic polishing machines, disc grinder; hand feed polishing machines. Represented by A. H. Behnke and T. A. Welch. Space 745.

Pyle-National Company, Chicago.—Turbo generators; headlight cases; Duplex valves; floodlights; classification lamps; marker lamps; back-up lamps; switches; terminal boxes; cab lamps. Represented by J. Will Johnson, J. A. Amos, William Miller, A. N. Martin, Crawford McGinnis, J. L. Reese, C. S. Gess, G. V. Wright, E. H. Hagensick, Walter Jansen and P. S. Westcott. Spaces 282, 284, 286, 288, 337, 339, 341 and 343.

Pyrene Manufacturing Company, Newark, N. J.—Hand fire extinguishers, including engines on wheels; automobile and truck tire chains. Represented by J. P. Maloney. Space 137.

Q & C Company, The, New York.—Robert Bosch high pressure lubricator for locomotives and shops; Nogroth metal grate bars for locomotives and power plants; emergency knuckles for cars; car replacers and car replacer clamps for rerailing equipment; Becker driving box wedge and shoe lubricator. Represented by E. R. Packer, H. T. Henry, L. T. Burwell, E. M. Smith and F. F. Kister. Space 38.

Quigley Furnace Specialties Company, Inc., New York.—Hytempite high temperature cement; Quigley acid proof cement; Q-Chrome cement; Ganisand refractory sand; Quigley refractory gun; Triple-A protective coatings. Represented by W. S. Quigley, L. P. Kellogg and F. J. Spillane. Space 135.

Railroad Herald, The, Atlanta, Ga.—Reception booth; copies of the Railroad Herald. Represented by E. C. Laird. Space "D."

Railway Devices Company, St. Louis, Mo.—"Western" angle cock holders; "Real" brake rod jaws; "Top Notch" wedges; Iron Horse car pedestal; "Real" pipe clamps; "Real" cylinder push rod; "Sta-Rite" coupler release. Represented by Sterling Campbell. Spaces 342 and 344.

Railway Metal Products Company, Chicago.—See Standard Railway Equipment Co.

Railway Purchases & Stores, Chicago.—Magazines. Represented by W. H. Dickinson, H. B. Kirkland, J. P. Murphy, Jr., K. F. Sheeran and Edward Wray. Space A.

Railway Service & Supply Corporation, Indianapolis, Ind.—Journal box packing waste and oil renovating plant. Represented by E. S. Pearce and L. D. Grisbaum. Spaces 124, 126 and 181.

Ray Pressure Snubber Company, Charlotte, N. C.—Pressure snubbers for use in connection with oil, air, water, steam and ammonia gages. Represented by E. L. Holmes, H. T. Sedgwick and A. E. Deskau. Space 787.

Reading Iron Company, New York.—Old Hickory staybolt iron; Reading genuine puddled wrought iron pipe; forged wrought iron equalizers; forged wrought iron draw-bar; forged and hand welded iron chain. Represented by J. G. Cottle, G. H. Woodroffe and J. K. Aimer. Spaces 721 and 723.

Red Star Products Corporation, Cleveland, O.—Two "Multiplex" saws. Represented by J. Everette Tompkins. Space 784.

Rees Manufacturing Corporation, Pittsburgh, Pa.—Superior automatic soot blower. Represented by W. R. Gellatly, W. O. Martin and James Stewart. Spaces 671 and 673.

Reliance Machine & Stamping Works, Inc., New Orleans, La.—SPEE-D high pressure grease appliances for locomotive connecting rod lubrication, consisting of terminal gun, road gun and filler neck or fitting. Represented by E. B. Norman, H. C. Manchester and George A. Pettit. Space 375.

Republic Steel Corporation, Youngstown, O.—Alloy steels; Upson bolts and nuts; stainless fire-box plate. Represented by W. M. Garrigues, Howard L. Miller, C. H. Aiken and L. S. Hamaker. Space 4.

Roberts Automatic Connector Company, Ltd., The, Sarnia, Ont., Canada.—Roberts automatic steam and air connector for passenger or freight cars. Represented by J. W. Roberts and William E. Saylor. Space 704.

Rock Island Manufacturing Company, Chicago.—Rock Island rigid and swivel base machinists' vises; Rock Island combination pipe vises. Represented by W. S. Etheridge. Space 735.

Roeblings' Sons Company, John A., Trenton, N. J.—Insulated wires and cables for railway electrification; wire rope and wire. Represented by G. W. Swan, A. L. Miller, A. E. Gaynor, J. L. Unsworth, E. V. Bertram, J. W. Whelan, J. E. Nolan, D. T. Brown, A. D. Clarkson, F. J. Maple, A. P. S. Bellis and E. E. Eagon. Space 6.

Royal Railway Supply Company, Inc., New York.—Foundation brake gear regulators. Represented by C. M. O'Boyle and W. H. Sauvage. Space 141.

Ryerson & Son, Inc., Joseph T., Chicago.—Lewis iron. Represented by T. W. Delanty, J. P. Moses and A. W. Willcuts. Space 163.

S K F Industries, Inc., New York.—Pair of wheels and axles from Pennsylvania R. R. passenger car and two housings which have run one million miles; full size standard box and bearing assembly of aluminum—stub axle and wheel to show disassembly; device for illustrating alignment; electric locomotive driving box; freight car truck; engine truck axle from New York Central first locomotive. Represented by W. L. Batt, H. E. Brunner, R. H. DeMott, E. M. Harshbarger, B. W. Taylor, T. E. Cushing, H. A. Allen, J. W Tawresy and R. C. Byler. Spaces 378, 380 and 382.

Safety Car Heating & Lighting Company, The, New York.—Axle generating equipment for car lighting; lighting fixtures; ventilating and ceiling fans; Silica Gel refrigerator car. Represented by W. L. Conwell, J. A. Dixon, W. L. Garland, J. S. Henry, H. K. Williams, L. Schepmoes, George H. Scott, C. W. T. Stuart, A. B. Mills, H. M. Wigney, S. I. Hopkins and G. E. Hulse. Spaces 232, 234, 271, 273 and on track.

Safety Equipment Service Company, The, Cleveland, O.—Super-Dreadnaut goggles; dust goggles, welding goggles; asbestos and leather leggings; asbestos and leather gloves and aprons; asbestos, leather and fire-resisting suits; Safety Toe shoes; respirators; gas masks; sand blast helmets; dust hoods; fire-resisting asbestos and leather sleevelets; saw guards; emery wheel guards; safety signs and bulletin boards; first aid kits and equipment; E-Z bolt anchors; Protexal safety lamp socket; ladder shoes; rubber acid-resisting gloves and aprons; hard boiled hats. Represented by Buell W. Nutt. Spaces 687 and 689.

Safety Grinding Wheel & Machine Company, The, Springfield, O.—No. 18 motor driven portable swing frame grinder; No. 176 "Rite-Speed" floor stand; No. 77 motor driven bench grinder; Safe-T-Bond wheels for high speed use; vitrified and silicate wheels for use at standard moderate speeds. Represented by H. G. Bennett, Charles G. Smith and George P. Smith. Spaces 747 and 749.

St. Louis Car Company, St. Louis, Mo.—Railway car models; photographs; equipment specialties; seats, etc. Represented by W. L. Conwell, J. H. Rodger, H. K. Williams and C. W. T. Stuart. Spaces 117 and 119.

Sargent Company, Chicago.—Sargent water columns, Sargent three-face water gage; Sargent two-seat gage cocks; Sargent safety water glass gaskets; Loedige blower valve; Ironclad water glass protector; water glass cocks; Marsh locomotive gages; Frost cocks. Represented by Louis L. Schultz. Space 94.

Savage Company, W. J. Knoxville, Tenn.—No. 2 roller die gray metal cutter for cutting soft steel up to ¾ in. thickness, straight or curved lines, circles or other irregular sections; No. 236 new series gray metal cutter, straight or irregular, cutting sheet metals up to 5/16 in. thickness for template cutting and production work. Represented by J. H. Murrian, W. D. Cunnyngham and K. J. Chapman. Space 709.

Schaefer Equipment Company, Pittsburgh, Pa.—Drop forged foundation brake gear details. Represented by F. A. Barbey, H. G. Cook, W. E. Cade, H. G. Doran, F. T. Dwyer, W. J. Fender, S. M. Hindman, B. C. Howard, E. G. Jackson, R. L. Nutt, Jr., Frederic Schaefer and E. J. Searles. Space 9.

Scullin Steel Company, St. Louis, Mo.—Dalman one level truck side frame; Dalman one level truck side frame, split; Dalman one level truck bolster; Dalman one level truck bolster, split; hopper car cast steel door frame; hopper car cast steel door. Represented by Harry Scullin, A. J. Davis, A. O. Woerner, F. L. Norton, B. L. Norton, E. S. Wortham, W. L. Jefferies, B. W. Parsons and N. S. Kenney. Space 12-B.

Scully Steel and Iron Company, Chicago.—Boiler tube cutters and expanders; boilermakers' tools; valve facing tools; flue swedger, Campbell nibbling machine. Represented by A. D. F. Simmons, Thomas Draper, Jr., J. W. Patterson and Elmer Stockum. Space 123.

Sellers & Company, Inc., William, Philadelphia, Pa.—Style BF exhaust feedwater heater equipment; non-lifting live steam equipment; sectional lifting live steam injector; combined main check and stop valves; drifting valve; boiler tester; safety squirt (coal sprinkler); rail washer; steel bronze tank hose nut; steel bronze coupling nut. Represented by Phillip E. Raymond, James R. New, T. J. Vallance, T. H. Jessop, John D. McClintock, I. P. Pedrick, D. F. Robinson, E. L. Holljes, V. L. Uhl, G. H. Benzon, Jr., A. Sellers, Jr., and J. C. Hinton. Spaces 240 and 295.

Shafer Bearing Corporation, Chicago.—Shafer self-aligning roller bearings for railroad service; Shafer self-aligning roller bearing industrial units; pillow block; hanger bearing; industrial mounting; flange mounting; take-up bearing; conveyor rolls. Represented by M. J. Tennes, George Stroh, Jr., Julius E. Shafer, Carl L. Shafer and Ray Tennes. Space 110.

Shell Petroleum Corporation, St. Louis, Mo.—Reception booth. Represented by C. A. Ralston and W. E. Hull. Space 755.

Sherwin-Williams Company, The, Philadelphia, Pa.—Reception booth. Represented by John A. Karb, Carroll Jarden, John Schlintz, F. A. Elmquist, W. J. Montgomery, Arthur Larkins and A. H. Kennedy. Spaces 266 and 321.

Simmons-Boardman Publishing Company, New York.—Railway Age; Railway Mechanical Engineer; Railway Electrical Engineer; Railway Engineering and Maintenance; Railway Signaling; Marine Engineering and Shipping Age; The Boiler Maker; Airway Age; Car Builders' Cyclopedia; Locomotive Cyclopedia; Maintenance Of Way Cyclopedia; American Builder; House Furnishing Review; books on transportation subjects. Represented by E. A. Simmons, S. O. Dunn, Roy V. Wright C. B. Peck, E. L. Woodward, R. C. Augur, H. C. Wilcox, M. B. Richardson, W. J. Hargest, J. C. Emery, D. A. Steele, H. B. Foster, A. G. Oehler, C. J. Corse, A. E. Ortlinghaus, E. A. Rehm, L. Milner, L. B. Sherman, Henry Lee, C. R. Mills, F. H. Thompson, George Slate, F. C. Koch, J. G. Little, R. E. Thayer, J. M. Rutherford, F. J. Fisher, H. E. McCandless, R. F. Beauchamp, Paul Traeger, H. A. Morrison and J. E. Anderson. Space 2.

Southern Wheel Company, New York.—Single plate chilled tread car wheels. Represented by A. H. Elliot, J. B. Spencer, S. C. Watkins, B. R. Brown, Dute Brown, R. A. Gow and E. P. Courier. Spaces 19 and 21.

Special Bolt Machinery Corporation, New York.—Semi-automatic valve finishing machine for repairing operating valves in standard air brake equipment; combined turning and threading machines for locomotive boiler staybolts; semi-automatic bolt turning machine for rod and frame bolts. Represented by Walter H. Foster and H. L. Kenah. Space 743.

Spring Packing Corporation, Chicago.—Spring journal box packing. Represented by John P. Landreth and W. H. Davis. Space 397.

Standard Auto-Tite Joints Company, Pittsburgh, Pa.—Auto-Tite flexible all-metal steam heat connections for rear of tender and between passenger cars; Auto-Tite flexible joints for connections between engines and tender; Auto-Tite flexible joints for connections on reservoirs, air pumps, roundhouse blower lines, yard terminals, and shops; Auto-Tite extra heavy joints for superheated steam and hot oils. Represented by Norman Allderdice, A. M. Frauenheim, E. H. Mattingley, H. W. Barhyte, R. J. Himmelright and J. T. Anthony. Space 363.

Standard Car Truck Company, Chicago.—Models and full size truck parts. Represented by Lee W. Barber, F. L. Barber, R. E. Frame, A. C. Deverell and E. W. Webb. Spaces 316 and 399.

Standard Coupler Company, New York.—Two types Goodwin leaf friction draft gear; types L-1 and K-4 Sessions-Standard friction draft gear; type FB-3 Sessions-Standard friction buffer. Represented by Douglas I. McKay, E. G. Goodwin, A. D. Morrow, George N. Orr and B. W. Brooks. Space 300.

Standard Oil Company of Louisiana, New Orleans, La.—Miniature oil field in operation; Standard railroad lubricants, both greases and oils. Represented by W. H. Booth and H. C. Ferrell. Spaces 318, 320, 401 and 403.

Standard Oil Company of New Jersey, New York.—Miniature service station. Represented by S. A. Megeath, J. W. Saybolt, W. F. Walsh, W. J. Johnston, R. A. Greene, A. J. Howley, F. C. Langdon and W. P. Lambert. Spaces 318, 320, 401 and 403.

Standard Railway Equipment Company, Railway Metal Products Company and Union Metal Products Company, Chicago.—Roofs; ends; release rigging; centering device; auto end doors; side doors; buffer springs. Represented by A. A. Frank, D. R. Arnold, S. G. Rea, G. G. Gilpin, J. T. Cralley, J. H. Schroeder, E. G. Fredell and J. E. Vaughn. Space 1.

Standard Steel Works Company, Burnham, Mifflin Co., Pa.—Deep etched sections of steel of normalized and annealed carbon, quenched and tempered carbon, normalized carbon vanadium, normalized and tempered low carbon nickel, quenched and tempered chrome vanadium, quenched and tempered chrome nickel. Represented by F. K. Metzger, R. Nevin Watt, J. D. Tyson, J. R. Guinn, H. J. Snowden, M. H. McCurdy, W. B. Keys, A. S. Goble, A. B. McCoy, C. G. Green, C. E. Hale and Walker Evans. Spaces 242 and 297.

Standard Stoker Company, Inc., The, New York.—Full size Standard modified type B stoker; full size Standard type B-T stoker (new design); model Standard type B-K stoker; full size Duplex type D-3 stoker; model type D-A coal pusher (new design); new design protecting grates. Represented by W. C. Peyton, F. P. Roesch, Frank C. Pickard, R. J. Schlacks, Henry S. Mann, A. L. Whipple, A. M. Hunt, W. D. Gray, E. A. Turner, G. M. Myers, J. H. Ichter and Edward Schroeder. Spaces 250, 252, 305 and 307.

Stanley Electric Tool Company, Inc., The, New Britain, Conn.—Portable electric drills, grinders, screw drivers and safety saws for cutting wood; stone saws for cutting stone and rocklike materials; hammers; Unishears for cutting sheet materials; Stanley-Atha hand tools, including hammers, sledges, ripping bars, and chisels and punches for heavy shop work; Stanley hand tools for general industrial use, including screw drivers, chisels, bit braces, planes, etc. Represented by J. M. Crowe, William Ernest and E. J. Hatch. Spaces 730 and 732.

Starrett Company, The, L. S., Athol, Mass.—Precision tools, micrometers, gages, levels, steel rules, calipers and dividers, indicators, steel squares; hack saw blades of high speed steel and Tungsten steel; steel measuring tapes; hack saw frames. Represented by D. Moffat, D. Findlay, W. J. Greene and H. E. Masters. Space 334.

Stevens Walden, Inc., Worcester, Mass.—Socket wrenches. Represented by W. M. Goodsell, F. H. Riegel and G. W. Fleming. Space 654.

Stucki Company, A., Pittsburgh, Pa.—Frictionless side bearings. Represented by A. Stucki, A. B. Severn and William C. Hansen. Space 427.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Headlights; turbo-generators; electric water cooler; George drain and relief valves; Ralco receptacles, plugs, switches, connections, etc. Represented by J. Hy. Schroeder, C. W. Marshall, W. T. Manogue, L. C. Richardson and C. E. Kinnaw. Spaces 28 and 99.

Superheater Company, The, New York.—Superheater header and throttle combination; Elesco S F X type exhaust steam injector; Elesco C F type boiler feed pump; Elesco centrifugal boiler feed pump; remanufactured superheater units. Represented by G. L. Bourne, F. A. Schaff, C. H. True, G. E. Ryder, H. B. Oatley, R. M. Ostermann, N. T. McKee, R. R. Porterfield, Bard Browne, C. A. Brandt, B. G. Lynch, G. L. Dolan, E. A. Averill, K. E. Stilwell, R. J. Van Meter, W. A. Buckbee, H. V. Jones, E. R. Stanford, T. F. Birmingham and F. R. Fitzpatrick. Spaces 210, 212, 245 and 247.

Superior Railway Equipment Company, Chicago.—Geared hand brakes. Represented by E. W. Richey and H. C. Smith. Spaces 768 and 769.

Symington Company, The, and Gould Coupler Company, New York.—Symington swivel butt coupler with Farlow attachments and vertical yoke attachments; Symington lateral motion truck device; Symington journal boxes of various types; Symington articulated type journal box lid; Symington double truss side frame; miscellaneous castings of acid, alkali and wear resisting metals; Nirosta corrosion and heat resisting castings; Gould freight and passenger type couplers; cast steel yokes; selective travel draft gear attachments; mechanical devices demonstrating operation of some of these specialties. Represented by C. J. Symington, T. R. Symington, R. H. Gwaltney, C. R. Naylor, Hynes Sparks, H. K. Smith, A. E. Hefferfinger, B. M. Jones, M. M. Llera, I. O. Wright and B. W. Kadel. Space 8.

T-Z Railway Equipment Company, Chicago.—"Crescent" metallic packing for piston rods and valve stems; T-Z flanged blow-off valve; T-Z pressed steel brake step; T-Z boiler washout and arch tube plugs; T-Z blow-off valve muffler; T-Z tender hose coupler and strainer; T-Z automatic drain valve; T-Z smoke preventer nozzle; T-Z pipe clamps and retaining valve brackets; T-Z front end blower nozzle. Represented by G. S. Turner, F. J. Kearney and J. S. Lemley. Space 292.

Textileather Corporation, Toledo, O.—Coated fabrics for upholstery, interior trim, vestibule curtains and car window curtains. Represented by S. W. Midgley, R. H. Preikschat, J. D. Lippmann, G. H. McGreevy and A. J. Healey. Space 5.

Timken Roller Bearing Company, Canton, O.—Completely Timken equipped 4-8-4 steam locomotive; 70-ton capacity Pennsylvania hopper car on the Timken inboard type truck; complete Timken engine truck used on the Cotton Belt Route; full size model of Timken bearings applied to the driving axles of the locomotive; full size model of a Timken engine truck wheel and axle assembly with the housing cut away; full size working models of the various roller bearing applications for passenger cars, locomotive tenders, self-propelled coaches, multiple unit cars and trolley cars; an exhibit showing one each of the actual bearings used in all positions on the Timken locomotive; small aluminum models of various Timken railroad applications; photographs. Represented by Walter C. Sanders, M. S. Downes, J. A. Morland and P. N. Wilson. Spaces 203, 205 and 207, and on track.

Tolhurst Machine Works, Inc., Troy, N. Y.—Laboratory size oil clarifier for reconditioning railroad car journal waste and oil. Represented by J. J. McKeon and J. C. Westaway. Space 652.

Transportation Publishing Company, Inc., Los Angeles, Cal.—Copies of the magazine Transportation. Represented by Harold A. Smith, Arthur E. Hooven and Barrett R. Small. Spaces "B" and "C."

Tuco Products Corporation, New York.—Tuco Flexolith car flooring; Tucolith car flooring; Royal and Regal car window screens; National standard roofing canvas; National and Universal steel trap doors; Resisto Insulation; Rockwul insulation; Eclipse deck sash ratchets; Reliance sash balances. Represented by D. W. Pye, H. B. Chamberlain, R. F. O'Leary, T. L. Miller, C. M. Schramm, C. H. Kadie, R. Gaines, E. J. Corcoran and W. Byrnes. Space 12-A.

U S L Battery Corporation, Niagara Falls, N. Y.—U S L car lighting batteries; railway signal batteries; flashlight and general purpose dry batteries; electric arc welders. Represented by R. J. Stanton, W. W. Halsey and H. A. Matthews. Space 701.

Ulster Iron Works, New York.—Ulster special hand-puddled staybolt iron; Ulster hand-puddled engine bolt iron; Ulster hand-puddled wrought iron rivets. Represented by H. T. Bradley, E. W. Kavanagh, C. F. Barton and J. H. Craigie. Space 71.

Underwood Corporation, H. B., Philadelphia, Pa.—Cylinder boring bar; valve chamber boring bar; crank pin turning machine; valve seat rotary planer; boring bar with direct drive; locomotive cylinder flange facing machine; pedestal milling machine. Represented by William O. Daily. Spaces 737, 739 and 741.

Union Asbestos & Rubber Company, Chicago.—Asbestos materials, packings and insulation materials; Unarco Insutape pipe coverings; Nonscor brake band lining. Represented by L. L. Cohen, J. H. Kuhns, W. R. Gillies and George J. Martin. Space 309.

Union Metal Products Company, Chicago.—See Standard Railway Equipment Co.

Union Railway Equipment Company, Chicago.—Ureco high power hand brakes including vertical wheel hand brakes, horizontal wheel hand brakes, drop type hand brakes for mill-type gondolas and flat cars; draft gear carrier; uncoupling device; self-locking refrigerator car door hinge; freight car ventilators. Represented by A. F. O'Connor, A. E. Biddle and G. E. Coffey. Spaces 72 and 74.

Union Spring & Manufacturing Company, Pittsburgh, Pa.—Reception booth. Represented by H. C. Bughman, Jr., N. S. Kenney, D. R. Warfield, J. W. Chandler, W. F. McCabe, A. C. Woods, W. L. Jefferies, Jr., F. E. Schaeffer and L. G. Woods. Space 122.

Union Switch & Signal Company, Swissvale, Pa.—Complete engine equipment for a coded continuous cab signal system, in operation. Represented by F. H. Nicholson, K. E. Kellenberger and L. L. Buck. Space 656.

United Machine Tool Corporation, New York.—S & N plate slitting, trimming and beveling shear; Braun radial drilling machine; L. M. G. electro-mechanical riveter. Represented by Ingo Maddaus, Mathias Riester, M. Naumann and Otto Lohmann. Spaces 778, 780 and 781.

Universal Draft Gear Attachment Company, Chicago.—Universal hand brakes for freight and passenger cars; Universal semi-automatic adjusters for freight car foundation brake rigging; Universal draft attachments. Represented by C. J. Nash, C. C. Kinsman, H. I. Wrigley, P. B. Camp and H. E. Bartsch. Space 294.

Universal Packing Corporation, Pittsburgh, Pa., and Durametallic Corporation, Kalamazoo, Mich.—Durametallic flexible, metallic packing for air, oil, water, gas, gasoline, distillates, tar, ammonia and acids; locomotive driving wheel tire machining apparatus. Represented by J. J. McQuillen and Herbert Lewis. Space 82.

Valve Pilot Corporation, New York.—Loco Valve Pilot, cut-off and speed indicator and recorder; Loco Recorder, speed indicator and recorder; Sto Recorder, speed indicator and recorder for switch engines. Represented by John L. Bacon, John L. Davidson and C. F. Pennypacker. Space 345.

Vanadium Corporation of America, New York.—Vanadium steel locomotive connecting rods, crank pin, piston rods, axle, valve gear, draft gear, driving spring, car spring; plate, tube and spring steel specimens; ferro alloys. Represented by W. A. Miller, J. A. Miller, C. B. Woodworth, H. T. Chandler, Jerome Strauss, A. W. Demmler and G. L. Norris. Spaces 228 and 267.

Vapor Car Heating Company, Inc., Chicago.—Unit thermostatic control of Vapor system; metallic flexible conduits; train pipe valves and couplers; car heating specialties; steam generating unit for motor rail cars; hot water heating specialties. Represented by J. E. Buker, N. F. Burns, L. H. Gillick, J. T. Clark, P. B. Parks, E. A. Russell, H. F. Lowman, L. B. Rhodes and R. P. Cooley. Spaces 230, 232 and 234.

Viloco Railway Equipment Company, Chicago.—"Viloco" exhaust pipe; improved sanders; bell ringer; pneumatic whistle operator; automatic rail washer; grease lubricator for piston rods, valve stems and air pumps; pressed steel brake step; uncoupling lever attachment. Represented by A. G. Hollingshead, J. M. Monroe, C. W. Ploen, G. P. Dirth and C. G. Learned. Space 262.

Walworth Company, Boston, Mass.—Bronze and iron body valves; Kewanee 400 union and steel union; A.R.A. malleable unions and fittings; locomotive valves; chrome nickel iron pipe; pipe tools, including a new Walco wrench. Represented by H. C. Goodwin, Howard Coonley, Jr., Henry G. Lambert, A. O. Beungardt and F. M. Churchill. Spaces 40 and 42.

Watson-Stillman Company, New York.—Shaffer-Watson-Stillman crosshead pin ejector; 90-ton double acting pulling jack for rebushing cylinders; 30-ton air engine telescopic ram pit jack; 30-ton pipe bender; leather packings; photographs. Represented by E. A. Stillman, H. J. Hair, W. J. Waters, H. D. Nitchie, J. F. Shannon, A. E. Chester, J. Kerr and E. B. Fleming. Space 367.

Waugh Equipment Company, New York.—Waugh-Gould draft gears for freight cars; Waugh spring plate draft gears and buffing devices for passenger cars; Waugh centering devices, rubberized six-wheel truck, Spencer-Moulton springs; rubber draft gears and buffing devices for passenger cars; Waugh portable test car; Waugh Steelkar handstraps. Represented by A. J. Pizzini, R. J. O'Brien, H. N. Ransom, R. C. Munro, L. M. Clark, W. M. Roche, J. W. Comstock, H. D. Page, G. R. Munro, H. Wiegand, J. A. Boyden, E. T. Shroeder, T. C. King, J. A. Cameron and Alexander Spencer. Spaces 346, 348 and 350.

West Disinfecting Company, Chicago.—Sanitary appliances; liquid soap dispensers; liquid soap storage tanks; deodorizing appliances; deodorants; disinfectants; paper towels; paper towel cabinets. Represented by H. E. Daniels, E. C. Daniels and C. P. Williams. Spaces 254 and 256.

Western Railway Equipment Company, St. Louis, Mo.—"Sure-Lox" draft key retainer; "Interlox" floor clips; "Interlox" brake ratchet and pawl; "Unitary" retainer valve holder; "Fixit" coupler lock adjuster; "Snap-On" coupler release. Represented by Sterling Campbell. Spaces 342 and 344.

Westinghouse Air Brake Company, Wilmerding, Pa.—Modified No. 6-ET brake equipment for gas rail cars; new cross-compound air compressor for high steam pressures and superheat; new auxiliary reservoir release valve; new caboose valves; steam governor steam valve; brake cylinder protectors; packing rings, Wabco packings and gaskets; new form centrifugal dirt collectors, flange pipe fittings, Pneuphonic air horns. Represented by S. G. Down, C. H. Beck, H. B. Gardner, Robert Burgess, C. D. Foltz, E. W. Davis, A. K. Hohmyer and J. B. Wright. Spaces 202, 204, 206, 208, 237, 239, 241 and 243.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.—70-ton and 110-ton new Visibility type Westinghouse oil-electric switching locomotive; 400-hp. Westinghouse oil-electric rail car; Westinghouse oil-engine generator unit with detail parts of oil engine; working model of locomotive drives; working model of link grate stoker; demonstration of cog belt drive; linestarters; time-starters; portable instruments; insulators; lightning arresters; panel boards; safety switches; line material; Westinghouse-Nuttall products; automatic arc welding set; manual arc welding set. Represented by G. H. Frobel, A. P. Schrader, T. C. Wurts, J. L. Crouse, F. E. Wynne, L. F. Burnham, D. W. R. Morgan, A. H. Candee, J. A. Wilson, C. S. Duddleston, L. E. Lynde, A. S. Wentworth, R. L. Herman, J. C. Erbeck, L. A. Spangler and R. P. Ross. Spaces 202, 204, 206, 208, 237, 239, 241, 243 and 660 to 665, inclusive. Also on track.

Wheel Truing Brake Shoe Company, Detroit, Mich.—Different types of wheel truing brake shoes. Represented by J. M. Griffin, F. F. Griffin and O. Perry Allen. Space 111.

White Company, The, Cleveland, O.—White model 51AS heavy duty, six-cylinder truck; White model 58S heavy duty-six cylinder tractor; White model 60 six-cylinder truck; White model 65A six-cylinder, 25-passenger bus; White model 54 six-cylinder, 16 passenger combination passenger-baggage bus; White model 65 six-cylinder 18-21-passenger bus chassis; White model 54A 26-passenger Club coach. Represented by Robert W. Woodruff, Saunders Jones, George F. Russell, Stanley P. Seward, H. C. Marble, H. E. Cline, J. M. Brown, W. A. Maynard, G. R. Bryan, J. H. Onions, H. P. Starbird, R. J. Logan M. D. Munn, R. S. Lapham, E. W. Stock, A. J. Scaife and R. E. Laisy. Spaces 626, 628, 630 and 632; and on boardwalk in front of Auditorium.

Whiting Corporation, Harvey, Ill.—Whiting electric drop pit table, ¼ size working model; Whiting electric locomotive spotter; Whiting electric portable car hoist. Represented by A. H. McDougall, M. J. Evans, J. R. Bates, R. E. Prussing, R. S. Hammond, H. K. Christie, F. P. Walsh, H. E. Reynolds, R. H. Moore, D. Polderman, M. F. Beetham, A. DeYoung, C. A. Hardy and O. L. Coffey. Spaces 750, 751, 752 and 753.

Willson Products Inc., Reading, Pa.—Chipping and grinding goggles with clear lenses; welding goggles with Wilson-Weld welding lenses; respirators for dust, fumes, etc.; helmets and handshields for electric welding operations. Represented by Donald Charlton and H. J. Larson. Space 80.

Wilson-Imperial Company, Newark, N. J.—Car cleaning and renovating compounds. Represented by C. A. Beaumont, W. R. Kelly and F. Sherritt. Space 78.

Wine Railway Appliance Company, The, Toledo, O.—Hopper door locks; drop end locks; side bearings; hopper door frames; cast steel body bolsters; cast steel cross bearers. Represented by William E. Wine, Cyrus J. Holland, William F. Cremean, Earl H. Fisher, Cyrus Hankins and George B. Christian. Space 7-A.

Wood Conversion Company, Chicago.—Balsam-Wool steel passenger car insulation; Balsam-Wool refrigerator car insulation; Nu-Wood insulating board; Balsam-Wool airplane insulation; Balsam-Wool building insulation; Balsam-Wool acoustical blanket. Represented by D. H. Corlette, C. M. Lee, A. D. Bowman, F. C. Vandervort, Jr., W. A. Wadsworth and A. H. Purdom. Spaces 15 and 17.

Wood Steel Company, Alan, Conshohocken, Pa.—Trap door and platform of passenger car of "AW" Diamondette floor plate in steel and aluminum; "AW" Diamondette running boards on tank cars; standard "AW" Diamond and "AW" Diamondette floor plate samples. Represented by A. L. Meyer, W. H. Dickson, J. R. Jones and I. M. Smith. Space 302 and on track.

Woodhead Company, Daniel, Chicago.—See Diehl Manufacturing Company.

Woods & Company, Edwin S., Chicago.—Various types of anti-friction side bearings for passenger and freight cars and locomotive tenders. Represented by William B. Ross. Spaces 222 and 261.

Worthington Pump & Machinery Corporation, Harrison, N. J.—Type S and BL open locomotive feedwater heaters; drifting control valves for delivery of deaerated feedwater, preheated by otherwise waste steam to locomotive boilers. Represented by L. J. Belnap, J. F. Cosgrove, W. N. Agnew, J. E. Buckingham, D. S. Ellis, J. M. Lammedee, W. B. Savary, P. B. Fenlon, William Christiansen, S. L. Brownlee, T. C. McBride, P. Diserens, P. P. Bourne and W. F. Perkins. Space 14-B.

Wrought Iron Company of America, Lebanon, Pa.—Staybolt iron; genuine puddled wrought iron rivets; wrought iron lawn furniture. Represented by H. M. Clymer, C. E. Brodhead, C. C. Osterhout and J. E. Rushmore. Space 332.

Yale & Towne Manufacturing Company, The, Stamford, Conn.—Yale chain blocks and trolleys; electric hoists; motor driven trolleys; hand traveling cranes; electric industrial trucks, tractors and trailers; Steubing hand lift trucks; steel bound skid platforms. Represented by R. B. Kite, R. L. Higgins, H. Gade, H. A. White, R. H. Irwin, C. H. Moeller, W. F. Redmond and C. O. Hedner. Spaces 65, 67 and 69.

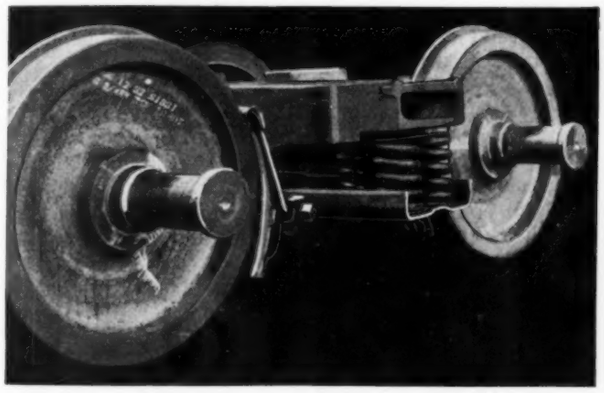
Youngstown Steel Door Company, The, Cleveland, O.—Youngstown corrugated steel doors. Represented by John P. McWilliams, Arthur J. Singer, Edward E. Robbins, Harold H. Henricks and C. H. Williamson. Spaces 424, 426 and 428.

New Devices

The Buckeye Quick Wheel-Change Truck

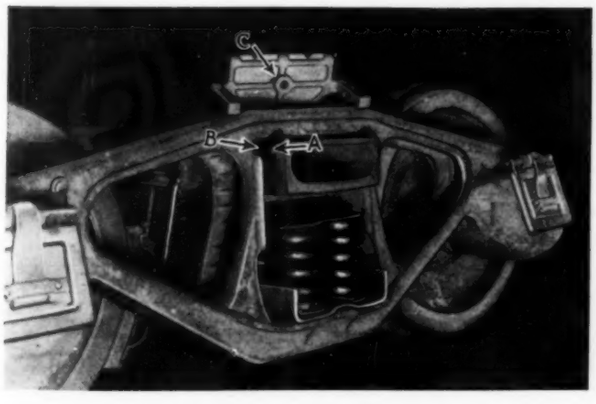
THE Buckeye Q. W. C. truck, which is on exhibit by the Buckeye Steel Castings Company, Columbus, Ohio, demonstrates the most recent improvement of the A. R. A. integral side frame and bolster construction.

The unique feature of this truck design lies in the fact that the advantages of the quick wheel-change feature have been accomplished without sacrificing interchangeability between side frames and bolsters of the Q. W. C. type with that of standard A. R. A. side frames and bolsters.



The Side Frame May Be Removed without Removing the Spring Plank, Springs, Bolster or Essential Brake Parts

The side frame is provided with recesses at the top of the bolster opening, but in all other details it follows the conventional A. R. A. design. This detail is shown in one of the illustrations which shows the bolster in a raised position with the removable outside bolster column-guide casting resting on top of the side frame. Under normal conditions this casting is securely interlocked with the bolster by means of laterally projecting lugs *A*, cast integrally with the upper part of the latter. Likewise, the bottom portion of this casting is held in place by the interlocking connection of the boss *C* and a corresponding hold cored in the underside of the bolster.



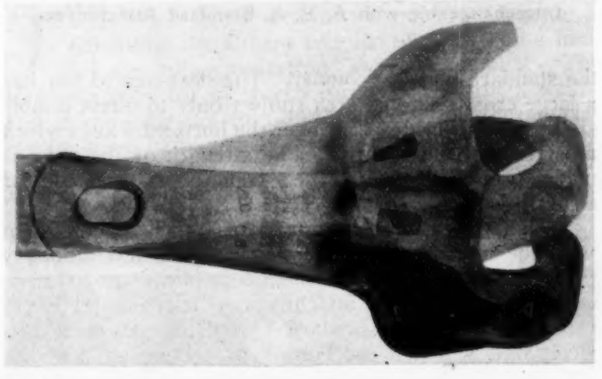
A View of the Q. W. C. Truck with the Bolster in a Raised Position

Compared with the standard A. R. A. type of bolster, the Q. W. C. bolster differs only in that the outside column guides are removable, hence the complete Q. W. C. bolster is entirely interchangeable with straight A. R. A. bolsters of the same capacity.

The operation of changing wheels in trucks with the Buckeye Quick Wheel Change feature is extremely simple. It is said that two men, each working with a car jack, are able to change a pair of wheels in less than 10 minutes, assuming, of course, that the journal box packing has been removed and the truck is out from under the car body.

American Radial Coupler

THE radial-type coupler, recently developed by the American Steel Foundries, Chicago, and on exhibition at this convention, is designed to prevent the wear and deformation of rigid coupler shanks, follower castings and connecting keys which are responsible in no small degree for the accumulation of slack in freight cars, with attendant material damage to rolling stock and lading. In addition, it is said that the new coupler materially decreases the attention and expense necessary for the proper maintenance of draft rigging.

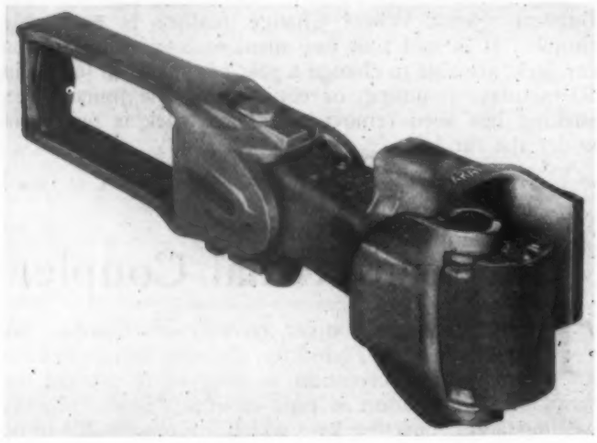


View which Illustrates the Angling Possible with an American Radial-Type Coupler

The American radial coupler is of simple and rugged design, providing a vertical pivotal connection between the coupler shank and the yoke and transferring the load directly from the coupler to the draft gear. The design causes no appreciable increase in weight and its simplicity eliminates the necessity of initial slack.

As indicated in the illustration, the coupler shank is provided with a vertical key slot and a rounded butt-end. The only part additional, to the usual cast-steel yoke and coupler assembly, is the butt casting, the concave base of which fits against the convex butt-end of the coupler shank. The butt casting has a slotted tongue which extends into the coupler shank and encircles the key. An even bearing between the large flat bearing face of the butt and the follower or draft gear is maintained at all times. The parallel sides of the yoke slots prevent turning of the vertical key, and the slightly wedge-shaped slot which is in the coupler shank permits the coupler to angle.

It will be observed that the yoke differs from the standard horizontal keyed yoke now in use only in the provision for a vertical key and the additional lugs which hold the key retainer. There has been no sacrifice of strength in the American radial coupler, the shank being designed materially stronger by calculation and test than



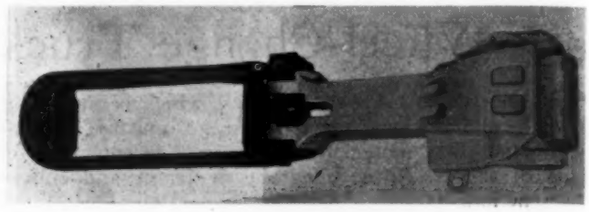
American Radial-Type Coupler and Vertical Key Yoke Interchangeable with A. R. A. Standard Attachments

the standard Type-D coupler. The heat-treated key has a large cross-sectional area subject only to direct double shear, a distinct advantage over the horizontal keys which must resist bending also. The strength of the yoke is made proportionate to the strength of the coupler shank.

Weights have been minimized as much as consistent with the increased strength. Due to the few auxiliary parts, the total weight of the whole application of American radial coupler and attachments is less than 90 lb. per car greater than the standard Type-D coupler with cast-steel yoke, which is the lightest of present applications. Existing standards of car construction have been rigidly followed, a complete assembly of the American radial coupler and yoke being interchangeable with the Type-D coupler and cast-steel yoke. The provision of the horizontal key slot in the yoke will permit ready substitution of a standard Type-D coupler at any time, if necessary. The vertical key attachment facilitates quick removal and application of the coupler and butt casting without removing the other parts. The yoke and draft gear are applied and removed exactly the same way as the present cast-steel yoke. The simplicity and ruggedness of the new radial coupler parts make it unnecessary to provide more restrictive tolerances in manufacture, assembly or application than those required with the standard Type-D coupler.

Cardwell Swivel-Butt Yoke

THE Cardwell swivel-butt yoke, designed to eliminate slack in draft attachments, is among the products exhibited by the Cardwell Westinghouse Company, Chicago. It provides a large bearing between the coupler and yoke, with no buffing load applied to the



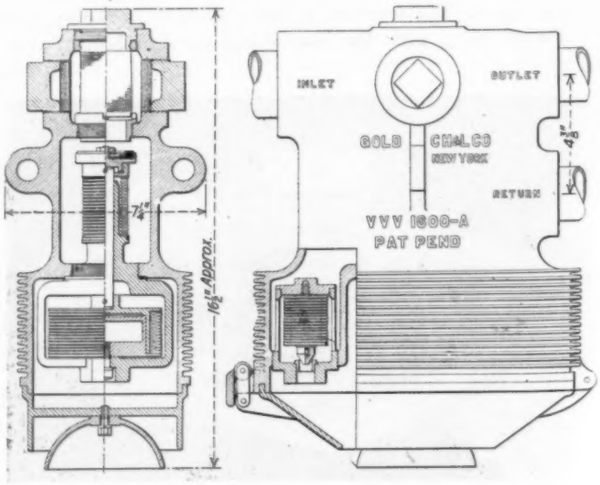
The Cardwell Swivel-Butt Yoke

pivot pin. The pivot pin, which is provided with a large bearing, is of hardened steel, fitted in a reamed hole, full floating and arranged so that a removal can be made from the bottom.

The yoke-gear pocket is cast in one piece and provided with large bearings at both ends to eliminate the lengthening of the yoke pocket due to key wear. The buffing and pulling strength of the swivel connection is in excess of that of the coupling shank. The coupler and yoke can be used with A. R. A. attachments or in connection with an approved coupler centering device.

Regulating Valve for Vapor Circuits

THE Gold Car Heating & Lighting Company, Brooklyn, N. Y., is exhibiting the No. 1600 regulating valve for vapor circuits shown in the drawing. This valve is connected directly to the cross-over from the train line, the steam entering a chamber in which there is a temperature-actuated diaphragm. This diaphragm, when contracted, lifts a seat open to the atmosphere. Its purpose is to drain all water of con-



The Gold No. 1600 Regulating Valve for Vapor Circuits

densation from the train line, allowing the water to drop to the ground. When steam is turned on it will enter this chamber, expand the diaphragm and close the outlet port.

This device in this valve is designed to do away with the necessity of slightly opening the end-valve on the rear of the last car of the train, as each car's condensation is taken care of by the valves beneath the car. It is also designed to do away with the necessity of pushing the water from the train line through the vapor valve and the inlet valve to the circuit.

The main valve being open, the steam passes to another chamber and from that to the inlet valve of the circuit. After the steam has filled the circuit, it returns to the regulating valve, expands the main operating diaphragm and closes the inlet port of this valve.

The valve can be furnished with up to 1½-in. seat openings and is made of Cuperloom which is an alloy of copper, aluminum and manganese, having the tensile strength of wrought iron and the density slightly above that of pure aluminum. The total weight of the large size valve is 28 lb.

In order that no restrictions in the steam flow be placed between the train line and the circuit itself, a valve, No. 2440, has been designed. This latter is an inlet valve having a 1½-in. seat area and is tapped for 1½-in. pipe, the same size as that used in the circuit itself. It has only two moving parts, the stem and the piston.

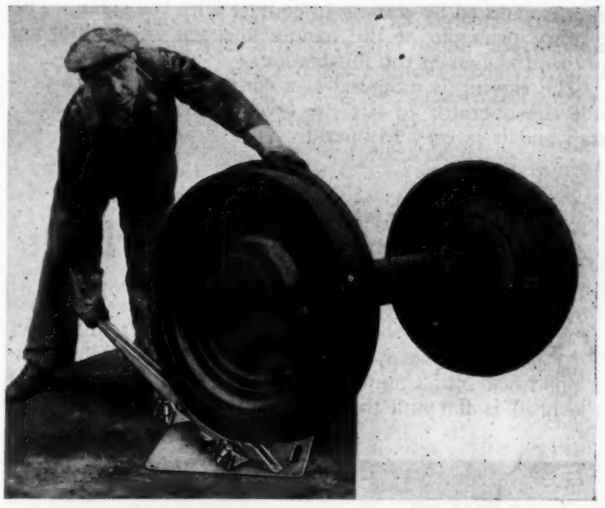
The Smith Wheel Pivot

THE Clark Manufacturing Company, 110 Turner street, Philadelphia, Pa., is including in its exhibit the Smith wheel pivot which is designed for use in changing the direction of wheels while being rolled about in the wheel shop or on the wheel platform. The pivot weighs 23 lb. and is comprised of two parts,

The Wheel Pivot with a Base Plate for Use on the Repair Track

the pivot proper and a plate on which it rests while in use. It is equipped with rollers to eliminate the friction of the wheel which rests upon it while the other wheel is being pushed in the desired direction. The device eliminates the use of a wheel stick and makes it possible for one man to handle a single pair of wheels.

For field or repair-track work, a base plate designed to straddle the rail is furnished. This plate is set on the rail with a footing on both sides to hold the plate firmly in place as the pair of wheels is swung around. Another use for the device is as a support for driving wheels when they are being machined or when setting valves. By the use of a pivot under each driver while



The Wedge-Shaped Runway Serves as a Handle to Boost the Wheels Off the Pivot after Facing Them in the Desired Direction

setting valves, both wheels may be revolved without changing their location on the rail.

In using the device, it is set down in front of one of the pair of wheels and the wheel rolled on to it. When the other wheel is rolled around to the desired direction, the wheels are boosted off the pivot as shown in one of the illustrations.

Rotary Coupler Release Rigging

THE Union Metal Products Company, Chicago, is exhibiting the Rotary coupler release rigging used on the rotary-operating Type *D* coupler. The lever is a solid bar of special forged steel without welds, and it can only become disconnected from the coupler eye by being lifted out of the lever bracket.

The inclined shelf of the lever bracket is an important feature. Any tendency of the lever handle to swing and unlatch the coupler anti-creep while the car is in mo-

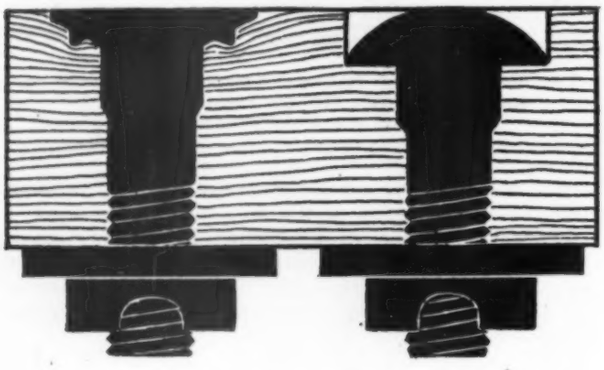
The Release Rigging for the Rotary-Operating Type Coupler

tion is checked by coming in contact with the shelf. The gravity principle of the handle keeps it in the normal position shown in the illustration.

The rigging is mounted at a convenient height to permit the operator to lift the lever without undue exertion and it is easy to operate.

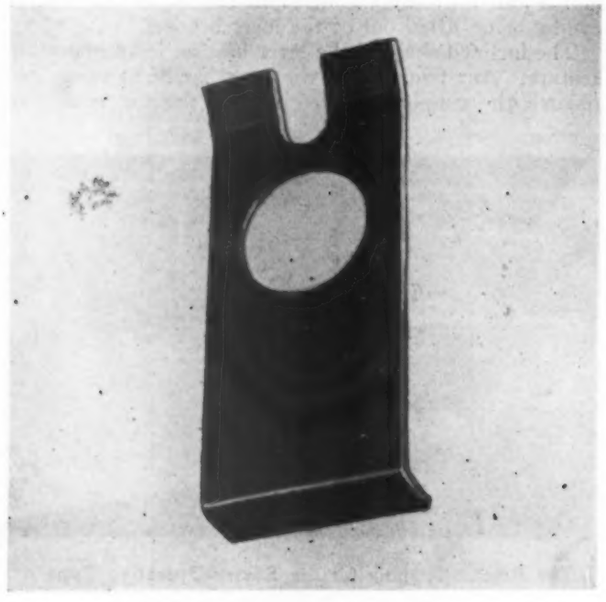
M-F Water-Tight Bolt

A WATER-TIGHT bolt which has as a distinctive feature a V-shaped projecting ring on the under side of its head, is being exhibited by the MacLean-Fogg Lock Nut Company, Chicago. The outer side of the head is flat and the under side sloping. When the

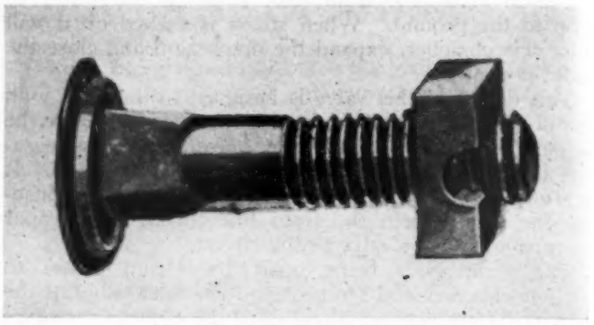


A Comparative Application of the Water-Tight Bolt

nut on the bolt is screwed up tightly, the V-shaped ring imbeds itself in the wood to eliminate water seeping past the head of the bolt. The flat heads of the bolts are drawn flush with the wood sheathing or flooring boards, thus making a smooth interior finish. Because of the shape of the under side of the heads of the bolts, the operation of counter-sinking is eliminated.



The M-F Marked Nut Lock



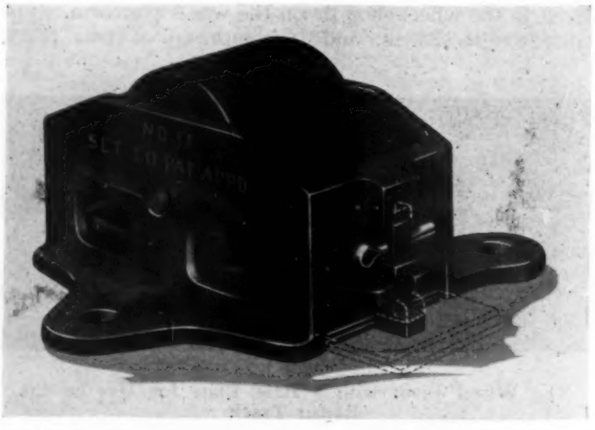
The M-F Water-Tight Bolt

The bolts are designed for use in place of carriage bolts in wood construction of any nature where the heads of the bolts are drawn against wood. They are ordinarily furnished with M-F speed lock nuts, although they can be furnished with common nuts if desired.

This company is also including in its exhibit a nut lock that is made from soft copper-bearing steel, which complies with A. R. A. specifications. The diameter of the bolt and width of the arch bar to which it is to be applied is plainly stamped on each nut lock. Both ends are formed to facilitate bending it into position.

Adjustable Side Bearing

A SIDE bearing, which may be adjusted through a range of 5/8 in. without special tools or without jacking up the car, is being exhibited by the Standard Car Truck Company, Chicago. The housing is made of electric steel and contains a forged, heat-treated



The Standard Adjustable Side Bearing

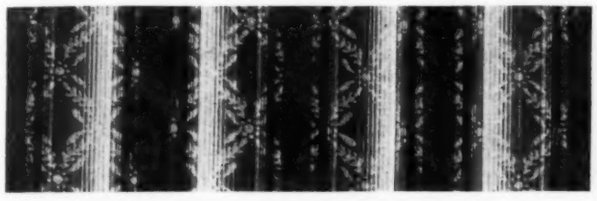
roller; the roller bears directly on a forged heat-treated bearing plate. All parts are contained in one unit, being held from displacement.

Starting with a 1/4-in. shim under the bearing plate, the height of the bearing may be lowered 1/4 in. or raised 3/8 in. Adjustment is made by removing the cotter from the locking pin, the bearing plate with the roller is lifted and shim plates removed or added through the end of the housing. These shim plates may be of ordinary sheet steel, cut for a loose fit in the bottom of the housing. Thinner shims may be substituted, if desired. The shim plates cannot get out of place even if the cot-

ter should be omitted. A two-hole application for securing to the truck bolster may be had by changing the end opening to the side of the housing.

Velmo Upholstery Fabrics

L. C. CHASE & CO., Boston, Mass., is exhibiting new patterns in Chase Velmo upholstery. These patterns, designed for use on railway equipment, are in frieze mohair material. Several of them have a

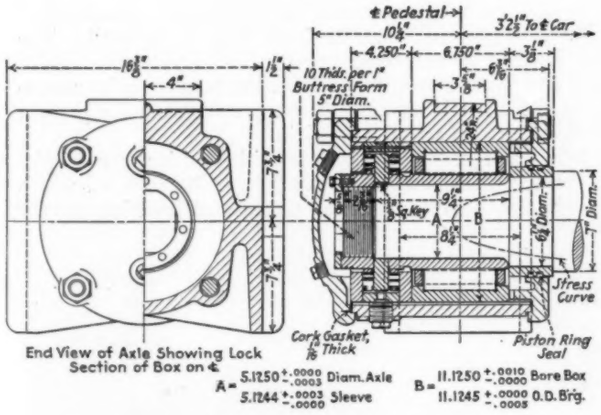


A Frieze with a striped Dyed-Yarn Effect

striped dyed-yarn effect. Others are in all-over figure designs.

The Messinger Car Journal Bearings

THE drawing illustrates the assembled form of the Messinger passenger car journal box manufactured and exhibited by the Messinger Bearings, Inc., Philadelphia, Pa. The thrust and journal rollers of this box are of the straight cylindrical type. These


℄ Pedestal
10 Thds. per 1" Buttress Form 5" Diam.
End View of Axle Showing Lock
Section of Box on ℄
Cork Gasket, ⅛" Thick
Piston Ring Seal
Stress Curve
A = 5.1250 +.0000 −.0003 Diam. Axle
5.1244 +.0000 −.0003 Sleeve
B = 11.1250 +.0010 −.0000 Bore Box
11.1245 +.0000 −.0005 O.D. Brg.

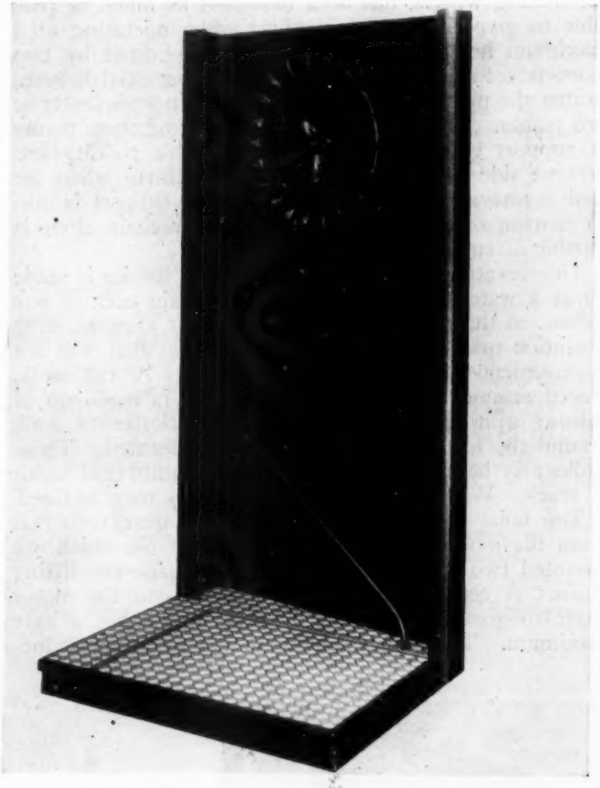
The Messinger Passenger Car Journal Bearing

rollers are made from a specially prescribed analysis of alloy steel which is a hardened tool steel not casehardened. The parts are heat treated to possess hardness, strength and toughness and are ground to true and uniform surfaces and diameters. The roller cages are made of bearing-metal phosphor bronze. The box and end covers may be made either of cast iron, chilled at positions exposed to wear, or they may be made of electric-furnace steel castings.

In the assembly of the box, the necessity for adjustment of the parts has been avoided. The nut at the journal extremity is screwed up as tight as possible where it is secured by a positive lock plate. Both front and rear end covers of the box are simultaneously drawn together by four bolts, which at the same time bind the roller bearings. A predetermined amount of play for the rollers is established when the bearings are manufactured so that the roller bearings cannot be cramped when mounting into the journal box.

A Wheel-Operated Vestibule Brake

INCLUDED in the exhibit of the Universal Draft Gear Attachment Company, Chicago, is the wheel-operated hand brake shown in the illustration. The brake consists of a hand wheel and release handle located on the inside of the end sheet and a power-increas-



The Wheel-Operated Vestibule Hand Brake

ing mechanism situated in a weather-proof case on the outside of the end sheet. Power is transmitted to the rods under the car by a flexible cable, enclosed for its entire length by pipes, and encased sheave wheels extending back from the end of the car. This construction is used to prevent the dragging of the hand-brake chains and rods on the truck frame.

The device is so designed that after the brakes have been set by turning the wheel in the usual manner they are held without any other operation on the part of the trainman. The release handle is pushed down when releasing the brake but the hand wheel does not spin backward when the brakes are released. This is effected by

a simple clutch arrangement which works automatically with the operation of releasing the brakes.

The brake has a quick release so that the brake shoes will not drag after the application and release of the hand brake. It is designed so that the power applied equals that of the air on all but the heaviest classes of passenger equipment and on these cars it is designed to give a power in excess of the usual specifications.

Icing Dining Cars

THE Yale & Towne Manufacturing Company, Stamford, Conn., has recently developed and is exhibiting an elevating platform truck particularly adaptable for icing cars. The truck is an electric-driven high-lift type modified to meet the particular needs of icing cars and is capable of handling seven 400-lb. cakes of ice per trip at a speed of eight miles an hour.

In order to obtain the extra high lift required, the tread of the wheels, and in many cases the diameter of the trailing wheels, has been increased as much as possible to give the utmost stability when operating at a maximum height. The platform is supported by two independent roller chains, separated a substantial distance so that the platform is really supported independently at two points. The relatively wide spacing of these points of support give the platform considerable rigidity and prevent side sway or tilting of the platform when the load is unevenly distributed. This dual support is also an element of safety, inasmuch as either chain alone is capable of supporting a full load.

The elevating platform which contains the ice is made up as a water-tight steel box with a drain cock at one corner, so that the accumulation of water after an icing operation may later be drained at a point that will not inconvenience the railroad passengers. A cat walk, placed around the side of the platform is made up of subway grating, which permits the workman to walk around the load when the platform is elevated. These walks may be hinged to permit a minimum overall width of truck. Where this is unnecessary they may be fixed.

The hoist unit employs a triple spur-gear reduction from the motor to the main drive shaft on which are mounted two sprocket wheels which engage the lifting chain. A centrifugal brake is mounted on the motor shaft to govern the speed of lowering within a safe maximum. The high efficiency of the spur-gear reduction permits a lift of 15 to 20 ft. per minute and a lowering speed of 28 ft. per minute. The lifting chains in effect form a continuous belt between the lifting sprockets at the bottom and the idler sprockets at the top. A heavy coil spring is employed on the slack of the chain to take up tension automatically and compensate for wear in the chain.

The main driving unit of the truck is of the double-reduction spur-gear type, sealed and protected from dust and the elements, to which a truck in this service is subjected. The driving end of the chassis is mounted on widely spaced springs to increase the stability of the machine so that it will not be considered dangerous for the operator when working in its highest position.

The upright and elevating members are designed to give clear visibility to the driver while running, no superstructure or other mechanical parts obstructing his vision. The machine is of the four-wheel-steer type which permits of a short turning radius so that it can be operated through aisles of normal width without alteration.

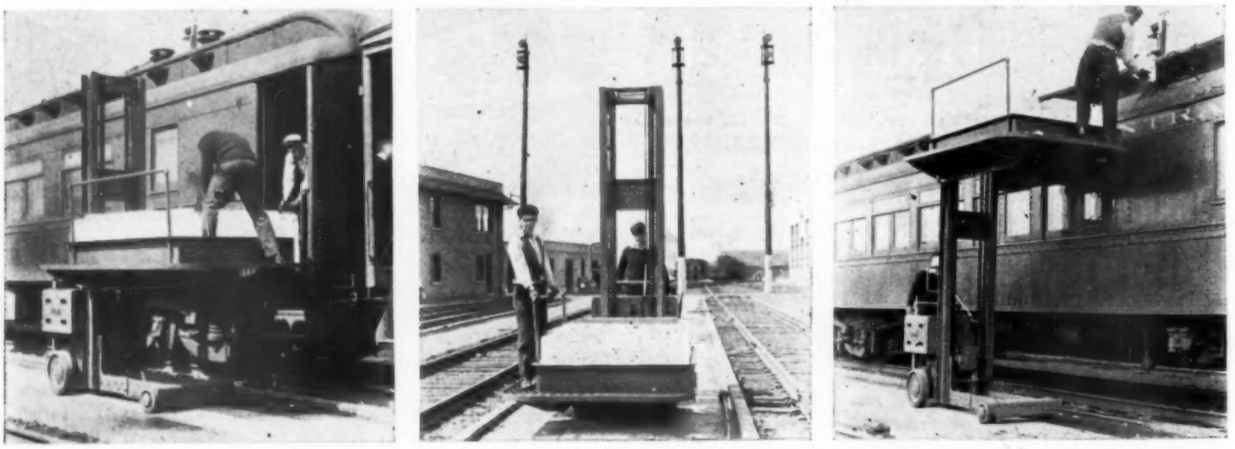
The truck was modified and tried out at the New York Central Terminal, Buffalo, New York, where it is said that two men with the truck, were able to ice as many dining cars in one and one-half to two hours as were formerly iced by four to six men, working practically all day.

Selective Travel Draft Attachments

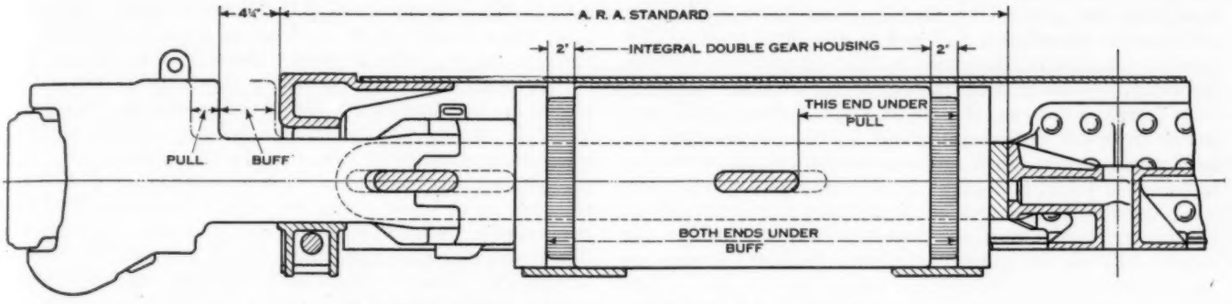
THE Symington Company, Rochester, N. Y., is exhibiting a new form of the A. R. A. alternate standard Farlow horizontal yoke attachments designed to accommodate, without change in locations of A. R. A. backstop and striking plate face, a draft gear incorporating the principle of selective travel.

Draft gears incorporating this principle are designed with a longer travel under buff than under pull. The attachments as exhibited provide for 2 in. travel under pull and 4 in. travel under buff, the total coupler movement therefore being only ½ in. greater than the present theoretical total travel of 5½ in.

The draft-gear housing is provided with a central slot to receive a standard 6-in. draft key, the ends of which rest in slots in the sill cheek plates and functions as the



The Yale & Towne High-Lift Truck for Icing Passenger Cars



The Symington Selective-Travel Draft Attachments

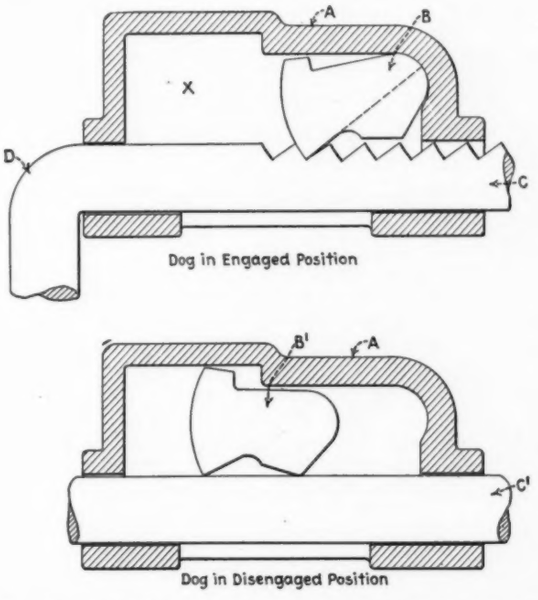
pulling stop similar to the second key in the present form of Farlow attachment. The housing is provided with identical friction elements in each end. Under pull the rear elements alone are operative while under buff both elements are brought into play, the housing moving towards the bolsters one-half of the total inward travel of the coupler.

The cheek plates for this form of attachment retain the present alternate standard second key slot although it is not required for this type of gear. This provides for the interchangeable use of the present A. R. A. alternate standard two-key attachments with follower block. A full size working model of the new attachments in combination with a dummy draft gear is on exhibition at the Symington Company's booth.

The Royal Foundation Brake-Gear Regulators

THE Royal Railway Supply Company, Inc., New York, is exhibiting two foundation brake-gear regulators which are designed to regulate the foundation brake-gear for uniform piston travel, uniform cylinder volume, and uniform braking power on each car or locomotive tender so equipped.

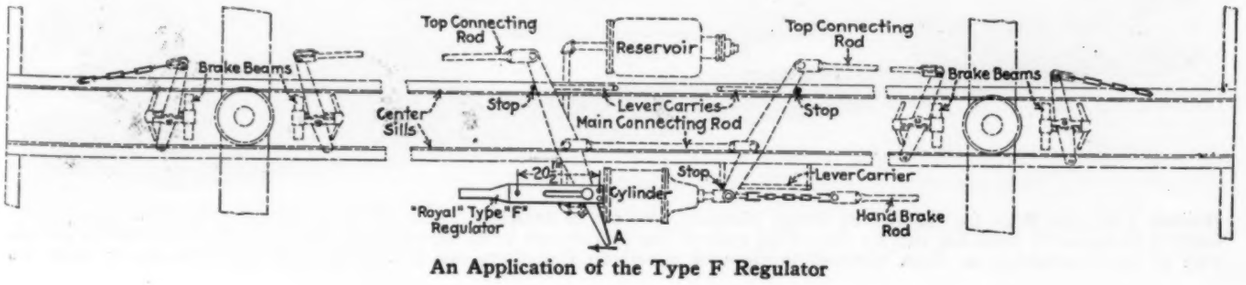
One of the drawings shows the housing of the type K regulators of which there are two on each car. *A* shows the housing cut through the center with the ratchet pawl *B* in locked and operating position on the ratchet rod *C*. *B'* shows the ratchet pawl in unlocked position in the housing *A*. The ratchet rod *C'* is slightly turned on the quarter, disengaging the ratchet teeth from the pawl. When it is necessary to take up surplus slack, the handle *D* is pulled toward the left and the floating pawl which rides on the ratchet bar, rides with it to the left until it strikes the end wall of the housing *A*. Should any further movement of the ratchet bar occur, the pawl will ratchet up one tooth or more to take up the excess lost motion *X*. The releasing of the pawl on the handle *D* permits the ratchet bar to return to the right to the same extent that the lost motion *X* provides, which permits a predetermined brake-shoe clearance and directly provides a predetermined piston travel to the foundation brake gear. The handle *D* hangs ver-



The Housing, Rod and Pawl of the Type K Regulator

tically and whenever there is a service or emergency application of the brakes, the dog remains engaged in locking position. The dog cannot jump out when it is in working position. Should the car be turned upside down to unload, the pawl cannot disengage and lose the slack that had been taken up previously.

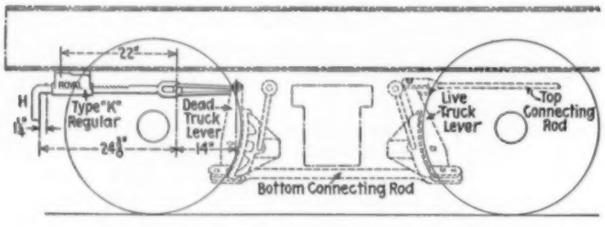
The pawl can be disengaged by turning the rod a quarter turn. It can be moved to the right in full release position, and when the operator lets go of the han-



An Application of the Type F Regulator

dle *D*, it drops back in a vertical position where it is locked by the pawl. The clevises from the regulator are attached to the ratchet rod and to the dead lever. The natural reaction of the clevis to the regulator is to hold the ratchet teeth in a horizontal plane with the housing. The drawing showing the application of the type K regulator shows it pulled out about 4 in. with one pair of new shoes on the truck and one pair of shoes worn out to the steel back, and ⅜-in. brake-show clearance. The lever carrier stops maintain a uniform angularity of all the power levers and the regulator is attached to the center sills of the car to eliminate twisting strains on the bolsters.

In operating the type K regulator, the operator takes hold of the handle *H*, pulls it out as far as it will go, pulling the shoes tight against the wheels, all surplus slack over and above the lost motion provided in the



An Application of the Type K Regulators

housing is taken up in the ratchet box itself so that when the brake is released the exact uniform take-up always occurs.

This device is designed to eliminate as far as possible inserting new brake-shoes in place of worn out brake-shoes, without first letting out the brake regulators. This is accomplished by cutting the brake-shoe clearance down from 1⅛ in. to ⅜ in. thus making it difficult to replace worn out brake-shoes without first letting out the regulators. This prevents the short piston travel which is caused by removing old shoes and inserting new shoes without first letting out the slack and then properly adjusting the brake over again.

The type F regulator is attached to the cylinder or used on the fulcrum end of the floating lever. In either case, the cylinder lever or floating lever is extended to form a handle which passes through the ratchet box of the regulator. By operating this handle, the piston travel is maintained at the fixed standing travel for which it was originally set, irrespective of shoe wear or other irregularities in the foundation brake-gear. The ratchet bar is provided with a lost-motion slot. When the carmen or brake operators adjust the brake, they pull the handle outwardly from the cylinder, forcing the brake-shoes against the wheel. Any surplus travel telescopes the ratchet rod and a pawl takes up the surplus slack. On release of the operator's hold on the take-up handle, the brake-shoes and the foundation brake gear will fall away from the wheel and go into release position, the exact amount provided for in the lost-motion slot in the ratchet rod so that it requires only a minimum amount of time to adjust the brakes in the entire foundation brake-gear.

Taylor Flexible Trucks

THE Flexible Truck Corporation, Reading, Pa., is exhibiting the Taylor flexible freight-car truck. The flexibility of this truck results from the vertical rotative motion of the side frame about the springs, spring plank and bolster, made possible by the circular center design of the side frame. This frame is a steel casting of integral box-U section with a circular opening in the center. In this center is inserted a circular cast-steel ring, provided with a flat shelf inside at the bottom for supporting the spring plank and columns on each side to engage the bolster lugs. The ring is retained in the side frame by means of two keys riveted in the frame and projecting into slots provided for them in the ring. The opening of these slots is such as to prevent any lateral movement between the ring and frame, but to allow clearance over the top and bottom of each key, which permits the rotation of the frame about the ring for a limited distance. The rings in each frame are in turn

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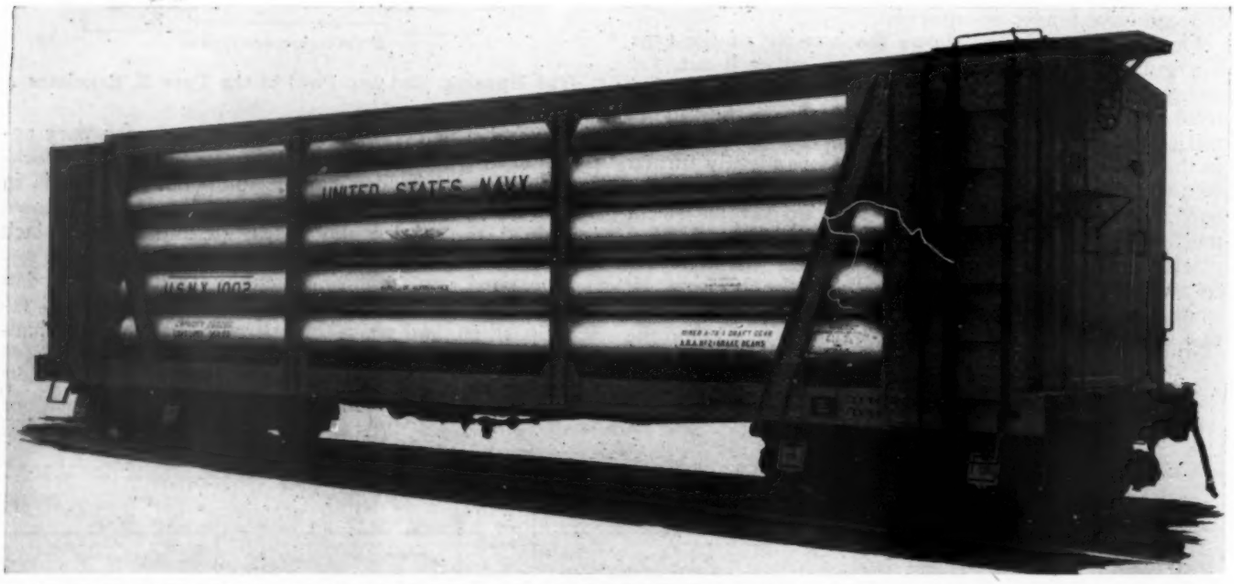


Helium Tank Car Built for the United States Navy—There are 28 Seamless Tubes 18 In. in Diameter by 38 Ft. Long which Carry a Pressure of 2,500 Lb. per Sq. In.—This type of Car Is referred to in Specification No. I. C. C. 107A3350 in the Report of the Committee on Tank Cars—The General American Car Company Is Showing Motion Pictures of This Car

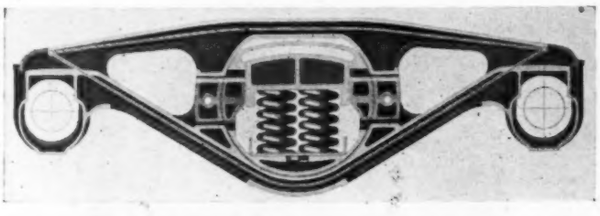
held laterally by the bolster lugs which, in addition to the spring plank, are the means provided for holding the two frames together.

The bolster used in the truck is of the conventional box design with the ends modified to fit the ring. In order to provide ample bearing area of the lugs and column ways a deep rib is cast on the bottom at each end. Center-plate bearings are of the A.R.A. design and the side-bearing pads on the bolster are arranged to

The Taylor Flexible Truck for 50-Ton Cars

take any style of side bearing with center spacing from 50 to 56 in. The spring plank used with this truck is of the customary pressed-steel design, provided with bosses on the bottom at each end which fit into cored holes in the side-frame rings, thus providing a means, in addition to the bolster, for tying the two side frames together laterally.

Each side frame, by this method of construction, is allowed a sufficient amount of rotation about the ring to provide a rise or fall of any one wheel of approximately 7 in. This movement of each side frame is independent



Sectional View Through the Center Line of the Side Frame of the Type F Truck

of the opposite frame, thus providing a mechanical flexibility of the truck. Any irregularities of the track surface such as high or low joints, crossings, uneven run-offs, etc., will cause a rise or fall of the wheel passing over these points. As this movement of the wheel is taken care of by a rotation of the frame about the ring on only the side on which such irregularity occurs, the truck structure does not twist and the consequent binding of the wheel flanges against the rail is eliminated.

The springs used in the truck are the Standard A.R.A. coils, the outside coil having a capacity of 12,500 lb. and the inside coil 3,500 lb. Five double coils with a capacity of 80,000 lb. are used on the 50-ton truck exhibited.

The Type F Truck

The truck shown in the photograph is of the standard type, the opening in the side frame a complete circle. The height from the rail to the center plate of the standard truck is 26¾ in., the A.R.A. standard. The side frame shown in the sectional drawing is for use on the type F truck. The top or compression member of this side frame is flattened at the center and the bolster construction at the ends is shallower than the standard truck. The ring inserted in the frame is made with a shallow arc at the top instead of a perfect circle. This type of truck is 1½ in. less in height from top of rail to top of side frame than the corresponding standard size truck, and the height from rail to center plate bearing and side bearing pad is 1¼ in. lower than the A.R.A. figure of 26¾ in. on the 40-ton and 50-ton trucks. The seventy-ton truck is 1¼ in. lower at the center-plate bearing while the side bearing pad is ½-in. lower. A 90-ton truck is furnished in this type of side-frame only. This provides a truck for use under cars with very deep sills or where the center of gravity of the entire car must be kept as low as possible.

Ajax Cup Dispenser

THE Logan Drinking Cup Company, 69 Prescott street, Worcester, Mass., is exhibiting a drinking cup dispenser which is designed especially for use in railroad coaches. The cup cabinet is placed inside

The Ajax Non-Protruding Cup Dispenser

a partition in such a way that it is still possible to withdraw the cups from the aisle and yet have nothing protruding in the aisle.

This dispenser has the features of the regular Ajax cup dispenser in that it is loaded directly from the carton, thereby insuring proper and cleanly loading. To install the cabinet, it is necessary to cut an opening in the partition 4¼ in. by 6¼ in.

Buckeye Steel Car End

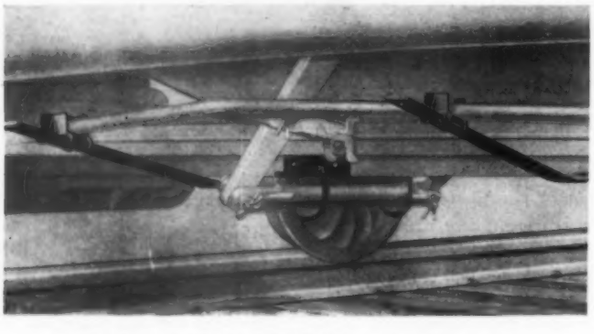
THE Chicago-Cleveland Car Roofing Company, Chicago, is exhibiting a steel car end designated as the Buckeye steel end. The construction employs a horizontal corrugation of the arch panel type. The corrugation is increased to a greater depth at the center by

The Buckeye Corrugated Steel End

decreasing the radius in the outside, or the tension side, of the section. This particular feature of design is used to enhance the strength value of the section.

Davis Bottom-Rod Guard

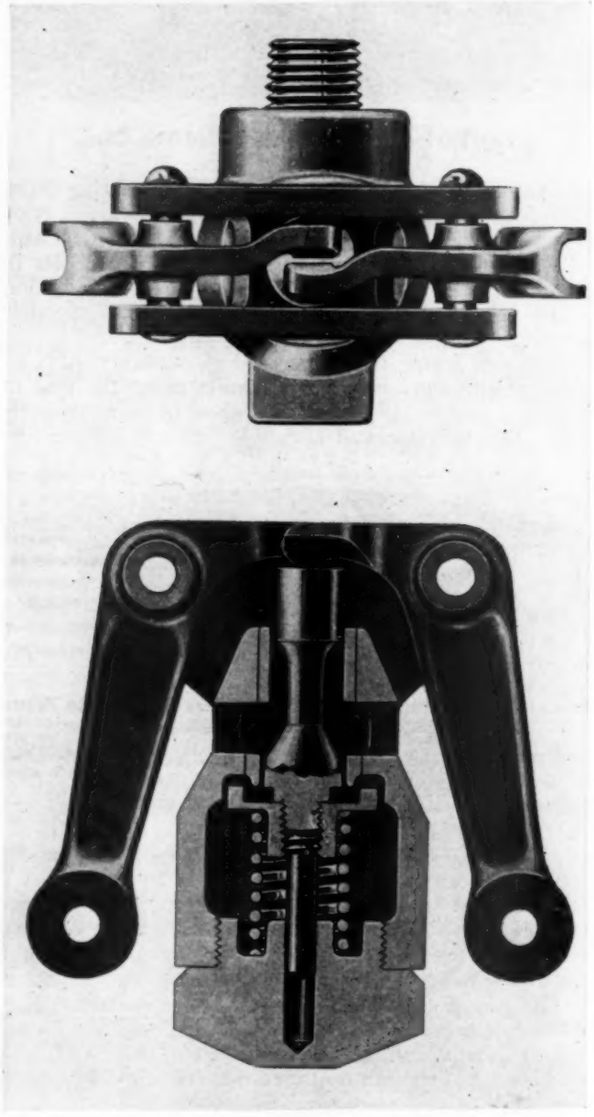
THE Davis Brake Beam Company, Johnstown, Pa., is exhibiting its Security bottom-rod guard which is composed of galvanized flexible steel cable securely welded to a bracket and riveted to the flange of the spring plank. The advantage of the flexible guard is that it is merely brushed aside by coming in contact with any foreign object between the rails and is not damaged by a blow that would demolish a rigid guard.



Application of Davis Flexible Bottom-Rod Support

Variable Release Valve for Auxiliary Reservoirs

AMONG the new devices being exhibited by the Westinghouse Air Brake Company, Wilmerding, Pa., is an auxiliary reservoir release valve having provision for varying the rate of discharge. This valve is operated in the same manner as the old valve, by hand rods extending from either side of the car. A short pull on the rod results in a slow rate of air discharge, a heavy pull opens the valve wide and reduces pressure quickly.



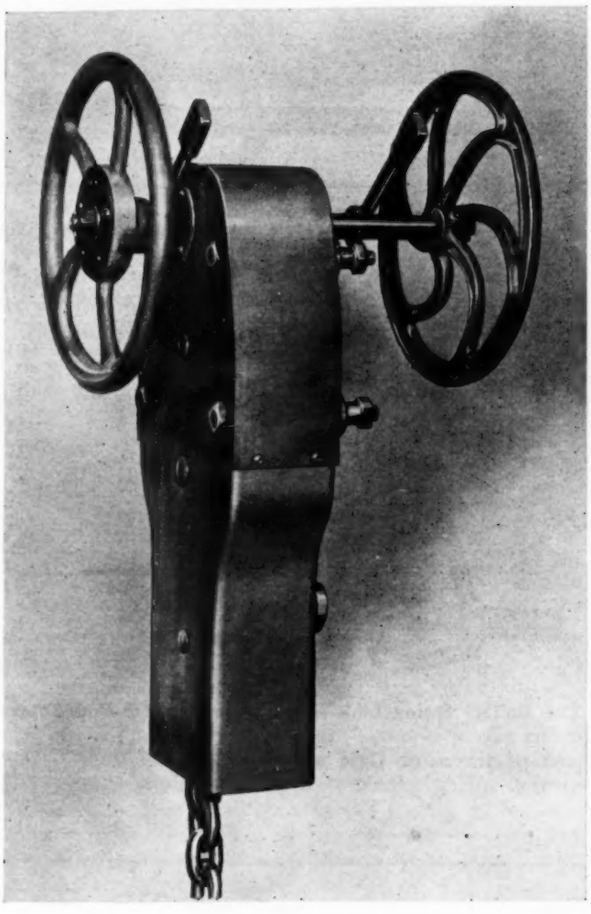
The New Release Valve Provides for a Variable Discharge Rate

With this variable exhaust feature now available a stuck brake can be released without excessive loss of air, while the auxiliary reservoir can, when necessary, be depleted three times as fast as formerly. This permits a train to be more quickly prepared for switching, thus saving valuable time at freight terminals.

Sectioned valves of the new design are available for detail inspection, while old and new valves are fitted up to show comparative operation.

The 450 Peacock Brake

THE National Brake Company, Inc., Buffalo, N. Y., is exhibiting its No. 450 Peacock brake which is equipped with two wheels. This is for operating either inside or outside of the car. It is arranged so that it can be mounted either inside or outside of the car and



The No. 450 Peacock Brake

can be operated with either two wheels or one as desired. The frame of the brake is of pressed steel and it is equipped with a 5/8-in. extra-test brake chain which is required on account of the high power which the brake yields. The whole brake weighs approximately 170 lb. and is designed to give a braking pressure of 13,000 lb.

Six-Wheel Rubberized Truck

A SIX-WHEEL passenger-car truck, equipped with Spencer-Moulton rubber cushioning pads, is being exhibited by the Waugh Equipment Company, Depew, N. Y. The pads, fabricated of pure rubber gum are processed so as to have a high factor of resiliency. The pads are provided under the center and side bearings, back of the bolster wear plates, under the equalizing springs and between the equalizer bars and journal box. They are located in these positions to improve the riding qualities of the truck and to eliminate the vibrations and noises that ordinarily occur at high speeds.

Six-Wheel Truck Equipped with Spencer-Moulton Rubber Cushioning Pads

Peerless Hylastic-Steel Friction Draft Gear

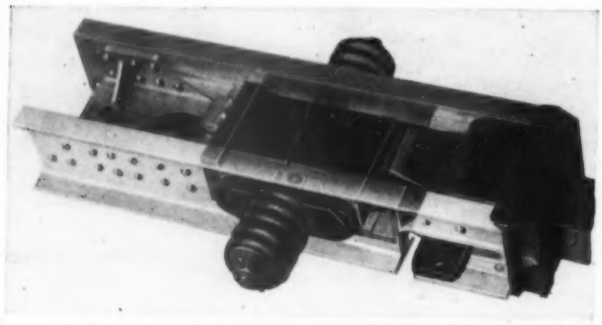
THE Peerless Hylastic-steel friction draft gear shown in the illustration is included in the exhibit of the Keyoke Railway Equipment Company, Chicago. When assembled for the A. R. A. standard pocket, the gear measures 24-5/8 in. but for 18½-in. or shorter pockets, the front and rear follower blocks can be omitted, all other parts remaining unchanged. The gear is comprised of front and rear follower blocks, side and follower wedges of Hylastic steel, a spring rod and a set of outer and inner coil springs. The total weight of the assembled gear per car set is 980 lb.

Spring action is obtained with 180 lb. of plain coil springs, which have an initial set and $3^{13}/_{16}$ in. movement in each closure of the gear. Positive friction is

The Peerless Hylastic-Steel Friction Draft Gear

obtained by the use of large friction blocks, each of which is guided in action by friction surfaces 18 in. in length on each block.

The gear is designed automatically to retain its working characteristics while the friction surfaces are being worn because the springs press the side wedges closer together, thereby maintaining the gear length. If the friction surfaces are worn sufficiently to cause the springs to be practically free when the gear is open, the tension nut is moved up two and one-half turns and the cotter pin inserted through the spring rod outside of the nut.



An Application of the Peerless Hylastic-Steel Gear

The Hylastic-steel follower wedges extend laterally through large slots in the car sills, forming a key by which the coupler is attached to the car underframe. No bolts, carry irons, or other small parts are required for holding the draft gear in position. The gear suspends the yoke centrally in its proper operating position and also forms a means of attaching the coupler.

In the application of the gear through the center sill slots, the inside flanges of the A. R. A. standard center sills are not cut away. All the parts of the gear can be inspected without removal of any part from the car underframe, the condition of the springs and of each of the friction blocks being determined by this exterior inspection.

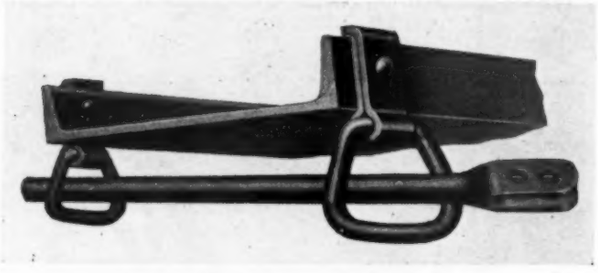
The Ureco Hinged Draft-Gear Carrier

THE hinged draft-gear carrier shown in the drawing is being exhibited by the Union Railway Equipment Company, Chicago. The device consists of a cast-steel carrier and two cast-steel brackets per car end and is so designed that the carrier can be dropped by removing one of the pins on either side of the carrier. After the draft gear is raised into position the carrier is swung up and secured in place by inserting the pin.

The carrier is designed with ample wearing surface for the gear or coupler yoke and is reinforced to withstand the shocks, weight and strain in service. It provides a tie between draft sills to prevent the latter spreading and is applicable to repaired cars as well as new equipment.

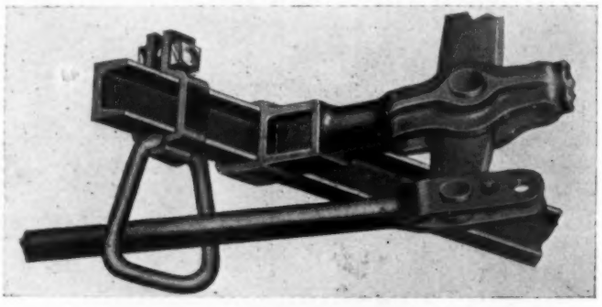
Buffalo Bottom-Rod Supports

THE Buffalo Brake Beam Company, New York, is exhibiting a brake-beam bottom-rod support which is a swing link and which is attached to the brake-beam channel. The link will swing when struck by snow, ice or debris between the rails, removing the possibility of breakage, and is non-vibrating.

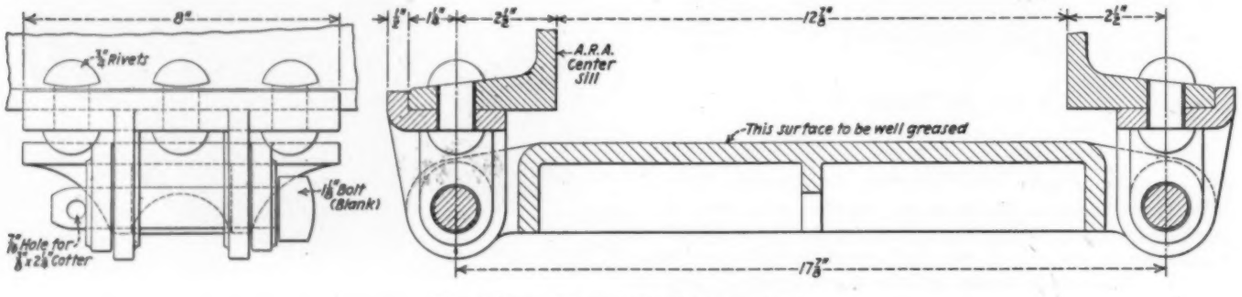


The Buffalo Spring-Plank Bottom-Rod Support

This company is also exhibiting a bottom-rod support of the same type which is designed to be riveted to the spring plank. A swinging link supports the



The Buffalo Swing-Link Brake-Beam Bottom-Rod Support

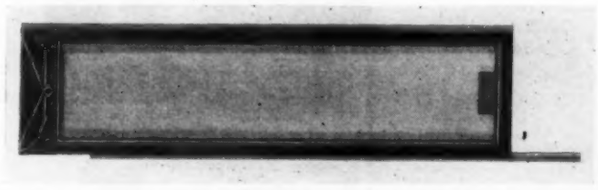


The Ureco Hinged Draft-Gear Carrier

bottom rod. It is adaptable for use on hopper cars where the contents is deposited between the rails, causing an obstruction. The link will swing when interference is encountered without breaking or bending, thereby binding the rod, and rendering the brake inoperative.

Regal Car-Window Screens

THE Tuco Products Corporation, New York, has on exhibit its Regal car-window screen which is furnished with 24-mesh No. 290-E gage copper screening. The frame is of steel or bronze with 1-in. stiles and rails welded together. An adjustable end shoe under spring tension automatically compensates for varying window widths and simplifies the insertion of



The Regal Car-Window Screen with 24-Mesh Copper Screening

the screen under the window sash. A rigid finger-hold at the opposite end facilitates handling. Renewable weather strips slip into grooves in the top and bottom rails and wire cloth is held in the frames by split beading. All steel parts are covered with a baked enamel finish to prevent corrosion. The screens are made in any width and height desired and can be supplied with or without hinged or removable deflectors that are 5¾ in. long set at an angle of 12 deg. with the side of the car.

A Rust Solvent and Penetrating Lubricant

GRAPHOL, a light-body liquid combination of oils, Ceylon graphite and chemicals, is being exhibited by the Graphol Products Company, Inc., Brooklyn, N. Y. It works on the principle of quick penetration and is used for the cutting, elimination and the subsequent prevention of rust and corrosion and gummy or retarding deposits.

It does not attract lint, dirt, etc., the vehicle oils under chemical-physical propulsion, thinning out and evaporating after depositing a dry graphite film. This deposit may be painted over with dark colors only, unless the graphite deposit is wiped off, leaving the pores of the metal filled with graphite. When this has been done lighter colored paints may be used.

Graphol is used in the signal department for the lubrication of locking beds of interlocking machines, and in the electrical department for the release of corroded connections on battery terminals, and on axle-generator equipment. At electrical generating plants, switching and sub-stations it is used for the cutting and removal of all gummy or retarding deposits on automatic reclosing circuit breakers, locking devices and locks, crank apparatus, motor bolsters, coupling bolts, small motor bearings, etc. In the mechanical department it is used for penetrating the threads of rust-bound nuts, bolts, etc., and for the prevention of rust on machined surfaces, stored stock and idle machinery.

Diamondette Flooring for Car Platforms

THE Alan Wood Steel Company, Conshohocken, Pa., is exhibiting its A. W. Diamondette floor plate of rolled steel which is designed for new application on passenger-car platforms, trap doors, sills, steps and tank-car running boards. The floor plate has a pattern composed of diamonds which are oval in shape and raised from the surface of the plate. Each diamond has beveled sides that taper off flush with the plate at all points. It is self-draining, has no flat areas in the

A. W. Diamondette Flooring Applied to Coach Platforms

raised pattern, and is free from pockets. While furnished in Nos. 16 to 12 U.S.S. gages in open-hearth steel, it is also rolled in heavier thicknesses and can be furnished in aluminum, brass, bronze, copper and all commercially-rolled metals.

AN AGREEMENT between the Rumanian, Polish and Czechoslovak governments providing for direct railway transit from Rumania to other Rumanian points through Polish and Czechoslovak territories was promulgated on April 28, according to a report received in the Department of Commerce from Bucharest. This transit agreement greatly facilitates railway communication between the Russian provinces of Bucovina and Transylvania, which, prior to the agreement, was effected by a long roundabout route through Russian territory.

Mercedes-Benz Vehicles With Diesel Engine

THE Mercedes-Benz Company, 247 Park avenue, New York, is exhibiting a motor coach and a truck equipped with a six-cylinder, 70 hp. Diesel engine, using heavy oil instead of gasoline for fuel. The motor coach, which will be displayed on the boardwalk in front of the Auditorium, has a seating capacity of 30 passengers and weighs, unloaded, 14,560 lb. It is claimed that the coach will run 8 to 10 miles on a gallon of fuel oil, costing approximately half as much as gasoline. With 36-in. by 8-in. tire equipment and the engine governed at 1,650 r.p.m., the maximum speed obtained is about 35 m.p.h. The body is made of steel panels riveted in place, making a very substantial construction. The interior is finished in brown, with a white ceiling, and the seats are upholstered in red leather. Other interesting body details include a V-shaped windshield, side ventilators and the bellows type hood construction. The coach has booster-operated, four-wheel brakes, a four-speed transmission, a multiple dry disc clutch and a torque-tube drive.

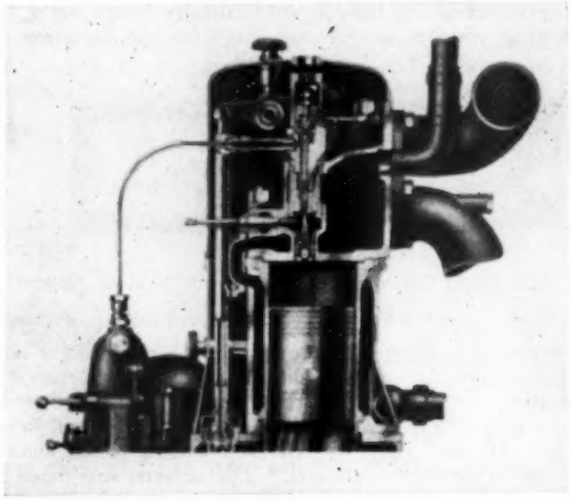
Geared Hub-Drive

The truck has a geared hub drive with all driving and braking forces transmitted through the center torque tube to a frame cross member located under the cab. The drive of each rear wheel is transmitted through a pair of spur gears, located within the hub, which is driven in turn by a differential having spiral cut bevel gears, located in a separate housing on the dead type rear axle. The chassis weighs 7,600 lb. and carries a useful load of 9,800 lb. The 70-hp. engine is of similar size and construction to that used in the coach.

The model OM-5 engine, used in both the truck and coach, has a bore of 3 15/16 in. and a stroke of 5 29/32 in. and a rated output of 70 hp. at 1,650 r.p.m. It is started by a conventional electric starting motor and controlled by a foot accelerator pedal. The fuel is supplied to the cylinders by a fuel pump, through injection nozzles, and is fired by the compression of the engine. There is no carburetor or ignition system required. The fuel oil injected by the pump is ignited in the pre-combustion chambers of the cylinder heads and then passes into the cylinders, in which the final combustion of the fuel oil takes place. To facilitate starting the engine when cold, "glow plugs," mounted in the pre-combustion chamber are heated by current from the battery.

The lower part of the crankcase, as well as the two cylinder head covers, is made of an aluminum alloy. Three cylinders are cast in each block. The crankshaft is carried in seven large main bearings in the upper part of the cast iron crankcase and a vibration damper is installed on the front end of the crankshaft.

The piston rods have a double T cross-section and the pistons are made of special aluminum alloy. The detachable cylinder heads contain, for each cylinder, one inlet and one exhaust valve, the fuel injector nozzle, the pre-combustion chamber and the burner which forms the connection between cylinder and pre-combustion chamber. The overhead inlet and exhaust valves are operated by push rods and rocker arms from the camshaft. The timing gears are enclosed and all moving parts are automatically lubricated. The driving gear meshes with the gears of the two auxiliary shafts, the



Detail of the Pre-Combustion Chamber

Mercedes-Benz Motor Coach Equipped with a Crude Oil Engine

upper auxiliary shaft driving the fuel pump and the lower shaft driving the generator and the water pump.

The main oil pump is driven by worm gearing from the camshaft by a vertical intermediate shaft and pumps the oil from filter to the various parts to be lubricated. A second small oil pump forces the oil through a fine filter.

The water pump delivers the cooling water from the radiator to the two cylinder blocks and cylinder heads and from there back to the radiator. An automatic thermostat causes a quick warming up of the cold engine, after starting. A fan for increasing the cooling effect of the radiator is provided which is driven by an adjustable V belt from the crankshaft.

Fuel Feed Pump

The fuel feed pump is of the diaphragm type and is located on the cover of the auxiliary drive shaft. It delivers the fuel from the tank, through a filter, to the injection pump, which injects the fuel oil into the pre-combustion chamber through the injection nozzles. A completely enclosed governor is attached which is driven from the pump shaft by means of gears.

The volume of the injected fuel can be regulated through the governor as well as by separate control rods; the time of the injection can be advanced or retarded, similar to the advanced and retarded spark of gasoline engines. In idling, the fuel feed to the first three cylinders is shut off and these cylinders produce the vacuum for the operation of the four-wheel brakes. The intake manifold, located on the left side of the engine, is equipped with an air cleaner and has a pipe connection and butterfly installed, for the operation of the brake. A mechanically driven air compressor can also be attached to the motor.

The exhaust of the motor is said to be smokeless and odorless and the carbon monoxide is reduced to a minimum.

The Mercedes-Benz Company, Inc., has appointed the National Railway Appliance Company, New York City, as its sales representatives for the United States.

White Exhibits Two New Heavy-Duty Motor Trucks

THE White Company, Cleveland, Ohio is exhibiting four motor coaches and three truck units, which are finding an increasing application among railroad operators.

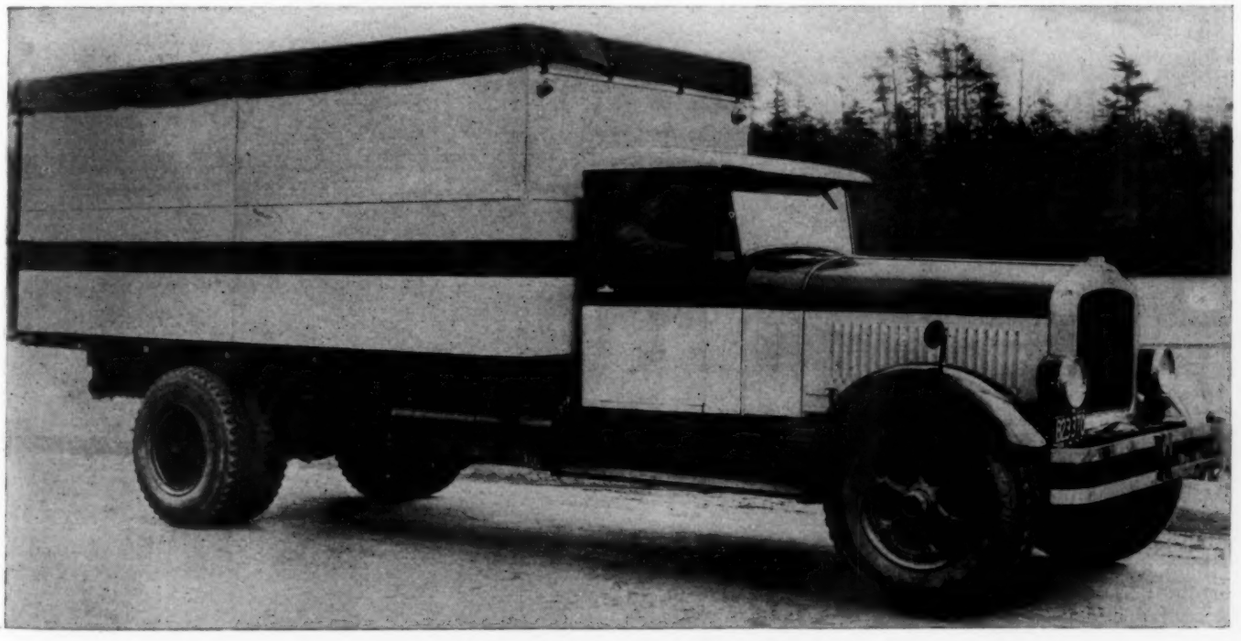
The club coach, which occupies a section of the boardwalk in front of the auditorium, is mounted on a model 54-A White, six-cylinder chassis. The De luxe fittings of this coach include overstuffed divans, radio music and electric fans. The body, built by the Bender Body Company, Cleveland, Ohio, carries 26 passengers and has ample space for baggage, provided by overhead racks.

A combination passenger and express coach for inter-city work, will be shown mounted on a model 54 White chassis. The body has a capacity of 16 passengers and ample space in the rear for carrying mail, passenger baggage and merchandise. Four auxiliary seats, in the baggage compartment, are available for use when needed.

A model 65-A White chassis with a 26 passenger inter-city type body is being shown. This model features economy of operation, speed and maximum seating capacity.

The Motor coach exhibit also includes a model 65, six-cylinder chassis having 180-in. wheelbase and designed for an 18 to 21 passenger body. To give greater loading space, the dash is built to allow the engine to project into the driver's compartment about 10 in. The six-cylinder engine is of similar design to the large model 54 engine.

Two recently developed, high-speed, heavy-duty truck units, models 58-S and 51-AS are being exhibited publicly for the first time. The model 51-AS is shown with a cab and L. C. L. freight body and the model 58-S has a cab chassis adapted to semi-trailer and trailer operation. Both models have a six-cylinder engine with a bore



White, Model 51-AS Truck Chassis

White, Model 58-S Traction Chassis

and stroke of 4 in. by 5¼ in. The engine is of monobloc construction having machined combustion chambers, overhead valves, a seven-bearing crankshaft and aluminum alloy piston. All bearings, including the valve mechanism, are lubricated by a pressure feed system. The single-plate clutch, operating in oil, has an automatically lubricated throwout bearing. The four-speed transmission has heavy ball and roller bearings throughout.

The model 58-S has a double-reduction, full floating type, rear axle and is equipped with air-operated, internal-expanding, metal-to-metal, brakes.

The model 51-AS has a single reduction, spiral bevel gear, rear axle with four wheel brakes, operated by external hydraulic cylinders. A vacuum booster is used in conjunction with the master cylinder.

The third truck unit is a model 60 delivery truck with a semi deluxe panel body is designed for store-door pick-up and delivery service. The body has two wide loading doors at the rear, protected by a steel bumper and an entrance and exit door on each side at the front.

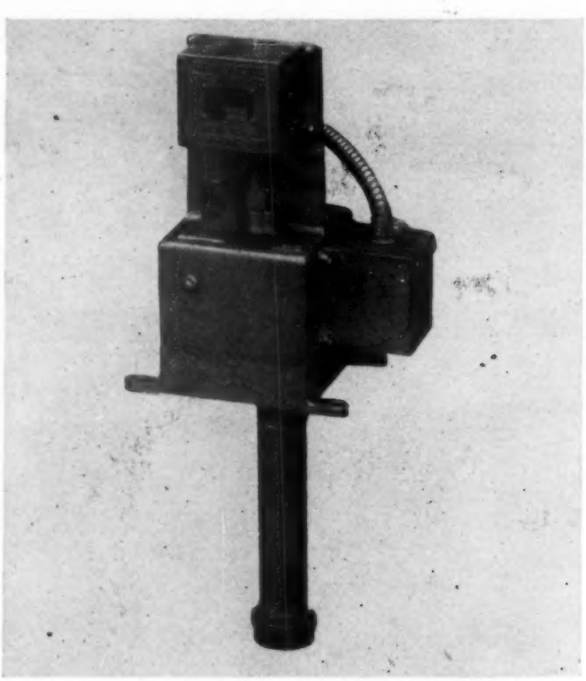
The Electro-Magnetic Chemical Proportioner

THE electro-magnetic proportioner, exhibited by the Paige & Jones Chemical Company, New York, and furnished with Paige & Jones lime-soda water-softening equipments, is so designed that by making the necessary adjustment any amount of chemicals can be fed to the equipment.

The typical proportioner feed curve, as shown, makes provision for the feeding of three chemicals separately, with a separate electro-magnetic proportioner for each chemical. The chart shows the amount of each chemical being fed and also shows the necessary adjustment required to feed any other amount which may be desired.

Another feature of the proportioner is the fact that all the water fed to the softener is measured by a standard water meter. On one of the shafts in the meter register are two fibre cams shaped like ratchet wheels with coarse teeth. Bearing on these cams are two spring contacts which are used to open and close an electric circuit, a cam construction being provided for a quick make and a quick break of the circuit.

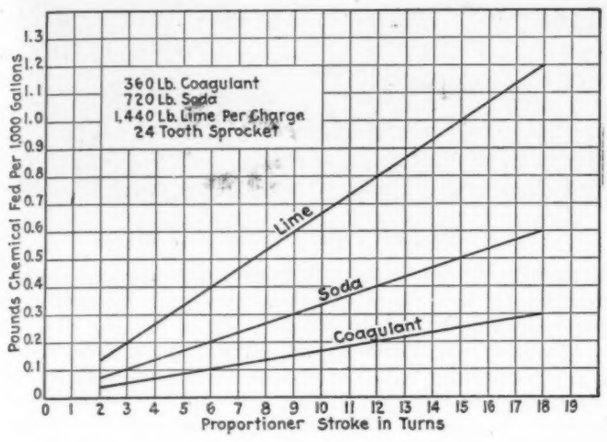
The mechanism gives a predetermined number of quick makes and quick breaks in the circuit and there is a known relation between the number of impulses in the circuit and the amount of water measured by the meter. These impulses are translated into mechanical motion for



The Paige & Jones Electro-Magnetic Chemical Proportioner

regulating the chemical feed by the electro-magnetic proportioner which consists of a solenoid at the top with an armature extension to a magnetic clutch and gear train. Each time the circuit is completed and the solenoid operates the armature is drawn up. This motion is conveyed through the clutch and a worm and worm gear to rotate a sprocket located on the outside of the casing.

A chain runs over the sprocket, one end of which is attached to a counterweight and the other end to a swivel take-off pipe in the chemical-mixing tank. The chemicals



Proportioner Feed Curves for a Plant Handling 100,000 Gallons of Water Per Hour

are thus fed by being skimmed off the top of the surface in the chemical tank as the take-off pipe is lowered by the turning of the sprocket.

Every time an electrical contact is made at the meter the solenoid and clutch function, giving a proportionate turn to the sprocket so that the take-off pipe is lowered by degrees and always maintained at the top level of the chemical charge until it is exhausted.

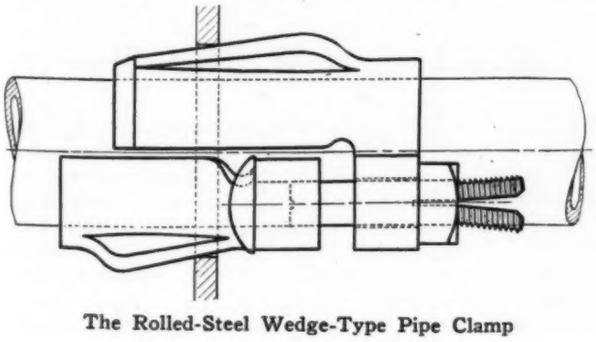
On the extension to the armature shaft a vernier sleeve regulated the stroke and thereby the amount of movement of the clutch. In this way accurate adjustment can be made of the amount of chemicals required for the treatment of any water.

The solenoid is located in a sealed bronze box and all the working parts of the proportioner are encased in an oil-tight bronze housing filled with oil.

Wedge-Type Pipe Clamp

THE Railway Devices Company, 705 Olive Street, St. Louis, Mo., is including in its exhibit a rolled-steel pipe clamp comprised of two parts, each of which has a wedging taper and which, when drawn together by a ½-in. carriage bolt, is designed to insure a permanent anchorage for the pipe. The parts of the clamp fit the pipe closely, each having a large bearing contact. It is so designed that the web of the crossbearer, bolster, bracket, diaphragm or sill through which the pipe passes will function as a part of the clamp. This is accomplished by the wedging action of the clamp as the two parts are drawn together.

When applying the clamp, the pipe is placed in a 2⅜-in. hole in the crossbearer, sill or bracket and the pipe is raised to permit the application of the bolt part of the clamp. The upper part of the clamp is then set on top of the pipe and the two parts pulled together by the ½-in. nut. When the clamp is drawn tight into the 2⅜-in. hole, the carriage bolt is spread to serve as a lock. The removal of the nut closes the end for re-application.



The Rolled-Steel Wedge-Type Pipe Clamp

Pyrene Pump-Type Fire Extinguisher

THE Pyrene Manufacturing Company, Newark, N. J., has on exhibit a 5-gal. pump-type fire extinguisher which is designed to throw a stream of liquid 45 ft. It is constructed of galvanized iron and is coated on the inside with corrosion-resisting paint. The outside is painted red and is provided with a polished instruction label.

The extinguisher has a double-acting, non-syphoning

The Pyrene 5-Gal. Pump-Type Fire Extinguisher

pump, each part of which is built of brass. The cylinder is made of heavy seamless-drawn brass tubing. The piston is built of composition metal. It has no metal washers and the suction end of the pump is provided with a copper screen to avoid clogging. Its non-syphoning feature insures stopping the stream when pumping is stopped, thereby preventing unnecessary water spoilage.

The extinguisher weighs 15 lb. when empty and 56 lb. when filled. It is 26½ in. high, 9½ in. in diameter and is equipped with a 24-in. hose which has a ⅛-in. nozzle outlet.

The Smith Coupling Jack

THE Smith coupling jack, which has recently been added to the line of multiplex pressure devices by the Clark Manufacturing Co., 110 Turner street, Philadelphia, Pa., is included in the exhibit of this company. It is designed with a 3-in. travel and has a pulling

The Smith Coupling Jack Being Used To Couple a Locomotive and Tender

capacity of 35 tons. The jack weighs 58 lb., is made of alloy steel and is furnished with a double-end construction, a turnbuckle at one end and a turnbuckle connection with two clevis connections at the other. These are used to take up all slack to permit the 3-in. travel to be used for handling the main load.

The jack is designed for such uses as the stretching of cable, the setting of heavy machinery, the pulling together of the sides of steel cars and the coupling of locomotives and tenders.

Whiting Electric Cross-Over Bridges

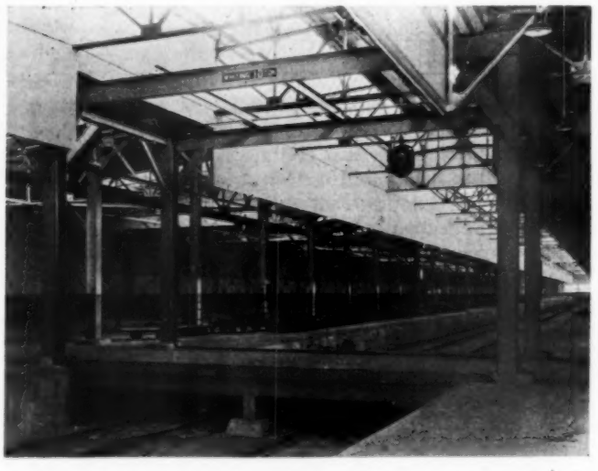
THE Whiting Corporation, Harvey, Ill., is exhibiting the Whiting cross-over bridges for modern freight houses using tractors and lorries. Two distinct types of these bridges are in use today—the ground level and the overhead type.

One illustration shows the ground-level bridge raised to the dock level and serving a tractor with its lorries. This bridge spans a double track and has a width of approximately 10 ft. Its movement up and down is 2 ft. per min. In low position, the bridge rests on cement

The Depressed Type of Cross-Over Bridge

piers with its tracks in alinement with the switching tracks. In this down position, cars and locomotives can be switched over the bridge.

The other illustration shows a Whiting overhead type cross-over bridge in dock level position ready for lorry service. Like the ground-level bridge, it is built in lengths and widths to suit the requirements of the



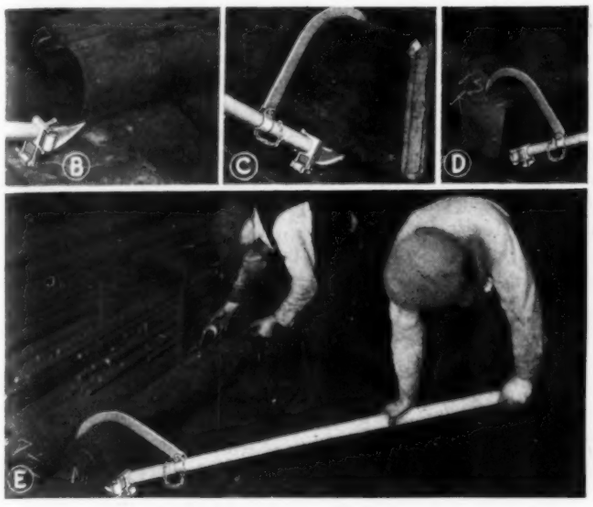
Freight House Cross-Over Bridge of the Overhead Type

freight house. In high position, it will clear a man on the roof of a house car. Electrically operated, it has a speed of 8 ft. per min. Both types of cross-over bridges have a capacity of ten tons and their screws remain stationary and out of the ground at all times.

Hook and Roller Bar

THE Clark Manufacturing Company, 110 Turner street, Philadelphia, Pa., is exhibiting a hook and roller bar which is designed for lifting and moving all forms of objects such as heavy cases, steel bars, I-beams, rails, locomotive main rods, logs, square timbers, etc. It can lift from zero to 5 in. without the aid of blocking, a turn of the handle giving the operator a low or high lift as desired.

The bar, 4 ft. 10 in. long, is constructed of steel tub-



The Smith Hook and Roller Bar

ing and weighs 20 lb. If necessary the hook can be removed from the handle. In the illustration, *B* shows an end lift on a round steel bar, *C* shows the handling of a case of goods, *D* shows the lifting of a square steel bar and *E* shows th. lifting and handling of a round steel bar.

Landis Forming and Threading Machine

A 1-in. automatic forming and threading machine exhibited by the Landis Machine Company, Waynesboro, Pa., has been developed to meet the demands for an automatic machine for threading bolts and screws to 1 in. in diameter. The capacity of this machine ranges from stock ½ in. to 1 in. in diameter up to 6 in. in length and will handle any length of thread up to 2½ in. and any style of point-cupped, flat, round, dog-point or full cone bolts or screws.

The machine is designed to insure a full thread at the start, an accurate lead and a minimum amount of taper, employing a special 1-1/16 in. Lanra head of the pull-off type equipped with Landis chasers. It is hopper fed, bolt or screw blanks being dumped or shoveled by hand into the hopper. They are then delivered through a magazine to fingers which transfer them to grips in the turret chuck. The length of the finished bolts is controlled by an adjustment of the transfer bracket, this member being graduated for various bolt lengths.

A new type of chucking arrangement is used with the machine. It is made of heat-treated alloy steel, to make the turret chuck stronger and lighter and to increase the indexing speed. The time element for the return of the forming and threading head and the indexing of the turret chuck is constant, regardless of the diameter, pitch, length of thread, quality of material or threading speed. When the forming and threading operations are completed an automatic accelerated motion entirely independent of the cutting speeds withdraws the forming and threading spindles and indexes the turret.

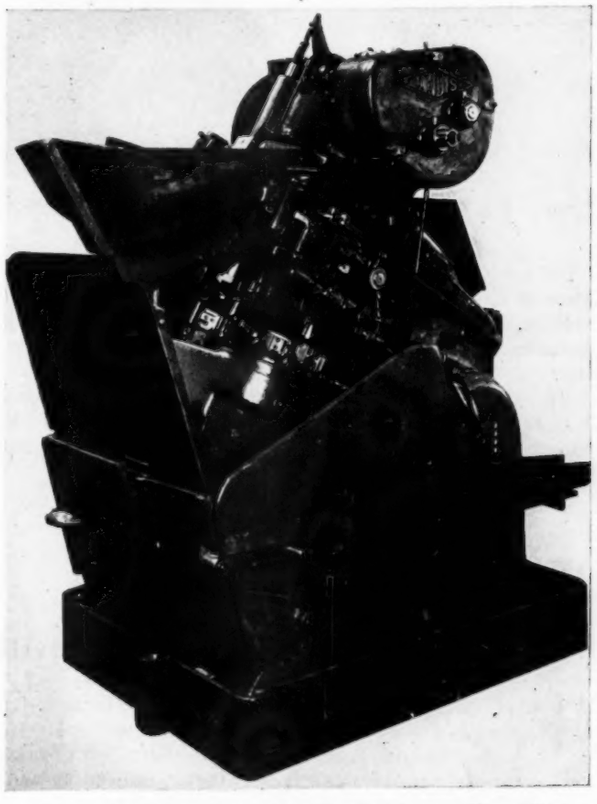
The indexing chuck has three stations, one of which is used for unloading and loading work, one for cutting to length and forming the end of the screws and one for threading. These operations are performed simultaneously. An ejector is provided at the unloading and loading station to remove the bolt in case it fails to drop from the grip.

A special gripping arrangement is used, which, by the use of an adapter, permits the grips common to the Landis ¾-in. threading machine to be adapted for the 1-in. machine. A line of sockets and grips that handles practically every type of bolt and screw used has been developed for use with this machine. Short bolts threaded up close to the head can be handled. Square-head bolts that vary in head size and that require a thread close to the head are handled by a unique bolt-guide attachment. This attachment gives the bolt a 90-deg. turn, permitting the bolt to be gripped across the corners. This method maintains a concentric thread form when there is a large variation in sizes on this type of bolt heads. Oval-neck bolts, guy clamp bolts, chuck bolts, fillister-head, carriage bolts, etc., can all be handled.

The opening and closing the chuck on a pivot that is parallel to the bolt provides thread concentricity regardless of variations in size.

The 1-1/16 in. Lanra threading head is a new development, designed expressly for use on this machine. It is made of high-grade carbon steel, heat-treated throughout and ground. It is centrally located in the front of the machine, screwed to the nose of the spindle and may be quickly removed without dismounting the yoke. Effective safety devices have been employed, one of importance being a device for closing the threading head in case a screw is accidentally twisted off in the head.

A forming head of new design which is threaded for easy attachment and removal from the spindle nose is



The Landis Automatic Bolt Forming and Threading Machine

also used. This forming unit is a steel head and is attached to a special type of alloy steel bushing. Change gears of pick-off type permit changes in the speed of the forming and threading head to be made in about two minutes. A speed of from 20 to 50 ft. per min. can be obtained for any diameter of thread.

Standard equipment on this machine is an oscillating conveyor that can be arranged for delivering the bolt at either the front or rear of the machine. Other methods of delivering the finished work are provided to suit individual handling methods and shop conditions. The machine is furnished for either belt or motor drive.

The Brill Multi-Tool

THE J. G. Brill Company, Philadelphia, Pa., is exhibiting a portable electric hand tool known as the Brill Multi-Tool which weighs 5¼ lb. and which has a four-bearing power unit. The tool was developed to obtain one power unit for a large number of different attachments.

More than fifteen major operations and a number of minor functions may be accomplished by its use. These

The Brill Multi-Tool

include drilling, grinding, buffing, sanding, sawing, nut setting, screw driving, planing, filing, valve grinding, reaming, under cutting, nibbling, shearing and mixing.

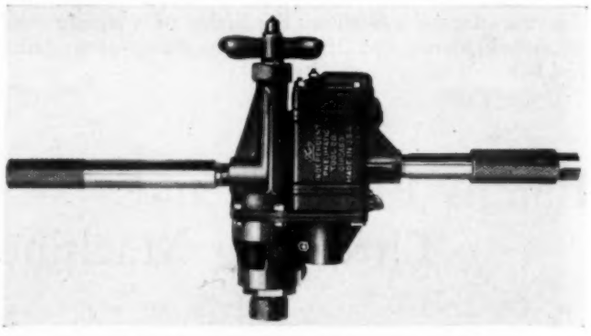
In railroad shops it is particularly adapted to cleaning the front ends of locomotives, the outside of smoke boxes for repainting, and for polishing side rods and valve-motion levers.

Prevention of Wet Grinding Corrosion

THE Dearborn Chemical Company, Chicago, has placed on the market a compound known as Lo-Ac. This commodity, which is an inhibitor of physical and chemical properties, is used in connection with grinding and cutting mediums in wet-grinding processes, thereby making it possible to obtain fine finishes and to protect the surface at the same time against rapid deterioration. Lo-Ac is not a grinding compound nor a cutting compound, but an inhibitor for the prevention of the corrosive effects of each. It is not a protective coating in the strict sense of the word and is not recommended for the storage of parts for an indefinite period of time, nor when placed in the weather exposed to rainfall, but is used to prevent immediate starting of corrosion after wet grinding.

Heavy Duty Rotary Pneumatic Drill

THE Independent Pneumatic Tool Company, Chicago, has developed a new drill, known as the Thor 275 rotary pneumatic drill, which is included in its exhibit this year. It is designed to eliminate certain mechanical inefficiencies in piston-type tools, which use considerable power, and have speed limitations, due to the reciprocating motion of pistons, connecting rods



Thor No. 275 Rotary Pneumatic Drill

and valve gear. In the new Thor drill, inertia forces, incident to the starting and stopping of pistons and connecting rods over the top and bottom centers of the crank motion, are minimized.

The Thor 275 is a one-man drill designed to operate smoothly and without vibration. One of its features is that it runs practically at free speed up to one-half its maximum load, thus giving constant working speed throughout that range. This is made possible because the governor is designed to open the throttle automatically.

Racing of the drill when it is being moved from one hole to the next is avoided. Its speed is governed so that it idles easily, consuming only a small amount of air when not actually at work.

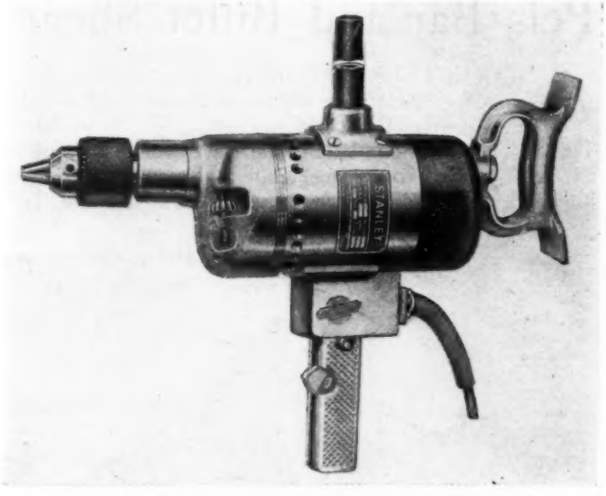
Because of the drill construction, the operator can get in close on the side without removing the dead handle. In order to eliminate wear, the cylinder is provided with a renewable bushing made of special alloy steel, hardened and ground to a fine finish. Ball bearings are used throughout, except in the lower end of the spindle, which has a roller bearing. This rotary pneumatic drill is made in two types, having speeds governed at 300 r.p.m. and at 380 r. p. m.

The drilling capacity of both types is 1½ in.; reaming capacity is 1⅛ in. The weight is 36 lb., and the length overall is 15½ in.

Stanley Portable Drills

THE Stanley Electric Tool Company, New Britain, Conn., is exhibiting a ¼-in. standard-duty drill and a ¾-in. heavy-duty drill. The body of the ¼-in. drill is 3⅜ in. in diameter and has a ⅞-in. offset to make the drill adaptable for use in confined spaces. It is equipped with nickel-alloy steel gears, aluminum-alloy housing, a quick make-and-break switch, and a high-speed motor.

The ¾-in. drill is equipped with two sets of thrust ball bearings, one on each end of the spindle, to take care of the vertical load encountered in heavy work. It

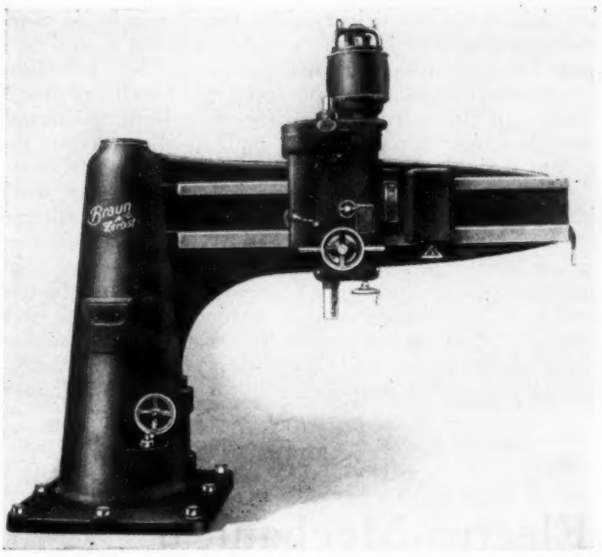


The Stanley ¾-in. Heavy-Duty Drill

is furnished with a pipe handle and a pipe-handle casting, both of which are detachable when using the drill in close quarters. This drill is also equipped with nickel-alloy steel gears, aluminum-alloy housing and quick make-and-break switch.

The Braun Radial Drilling Machine

A BRAUN heavy-duty radial drilling machine, model ERB-40, which has a maximum spindle radius of 6 ft. 6¾ in., is being exhibited by the United Machine Tool Corporation, New York. This machine has been designed for cases where large numbers of holes of approximately one diameter have to be drilled continually. The arm is a box casting designed to eliminate bending which occurs under the heavy cutting strains with the saddle in the extreme position. It is secured by means of a hand lever. The saddle traverse along the arm is accomplished by a hand-wheel located on the same shaft as the double-end lever controlling the quick vertical adjustment of the spindle which is fed automatically by spur gears, worm rack, and pinion. A double-ended lever which controls the quick vertical movement of the spindle actuates the feed clutch, the feed being automatically tripped at the extreme position of the spindle. The spindle is driven through spur gears by a vertical



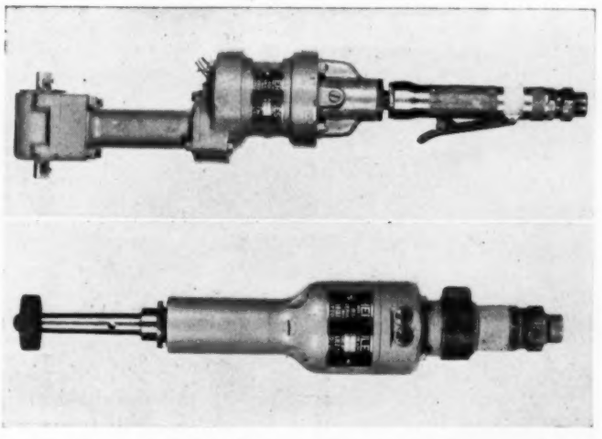
The Braun Model ERB-40 Radial Drilling Machine

motor on top of the saddle. If the speed of the spindle has to be varied, this can be done electrically by using a d. c. variable-speed motor or an a. c. pole-changing motor. With the former a very fine variation of spindle speeds can be obtained; with the latter two speeds can be obtained in the ratio of 1 to 2.

The column is a box casting with a wide base that is ribbed to insure rigidity. The arm swings 180 deg. on thrust and radial ball bearings and a clamping ring is used to hold it in any desired position. A vertical motor mounted directly on the head provides four feeds ranging from .0088 in. to .0195 in. and 12 spindle speeds ranging 46 r. p. m. to 900 r. p. m.

Two New Buckeye Portable Tools

AMONG the new tools on exhibit by the Buckeye Portable Tool Company, Dayton, Ohio, will be found the Hercules pencil grinder and the Hercu-



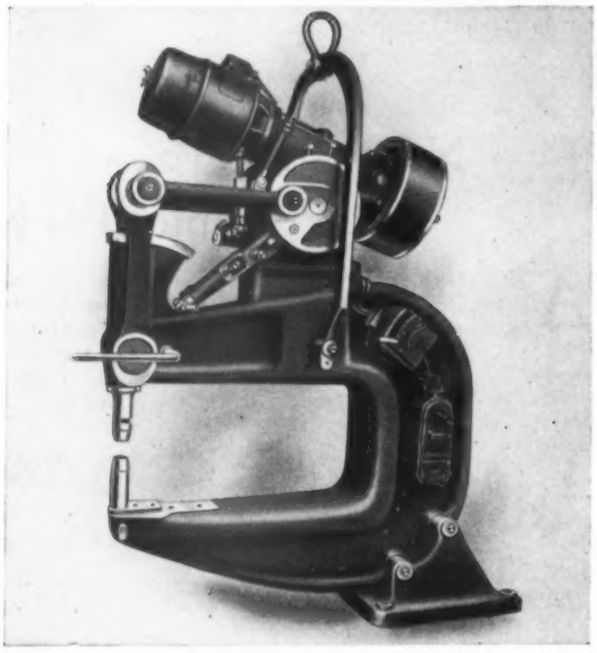
In the Upper Illustration Is Shown the Hercules Right-Angle Nut Driver and Below is the Pencil Grinder

les right-angle nut driver. The pencil grinder is a recent development in small grinders for use with emery pencils, rotary files and small emery wheels. It weighs 3½ lb. and operates at a free speed of 22,000 r. p. m. A feature of this tool is a one-piece rear head and thumb throttle which can be used to regulate the speed of the tool as desired.

The right-angle nut driver is designed for work in close quarters and is especially adapted to railroad shop work. It can be furnished to operate at 660 r. p. m. or 1,000 r. p. m. and has ample power to drive ½in. nuts and ⅝ in. cap screws. The driving end of the tool measures four inches across, making it especially well fitted for close corner work. The motor unit is built on the Hercules rotary principle which has been the fundamental feature of Hercules tools for a number of years.

Electro-Mechanical Riveting Machines

THE United Machine Tool Corporation, New York, has in its exhibit an Elemge self-contained electro-mechanical toggle-lever riveting machine, the power of which is furnished by an electric motor. A flywheel located on the extended motor shaft supplies the requisite kinetic energy at the moment pressure is exerted, so that the motor will be under full load only at the moment pressure is applied. The movement of the flywheel is transmitted by means of a worm and worm-wheel and crank discs to the toggle lever mechanism. The engaging and disengaging of this mechanism is accomplished by means of a dog clutch, with renewable jaws, located between the worm wheel and one of the crank discs.



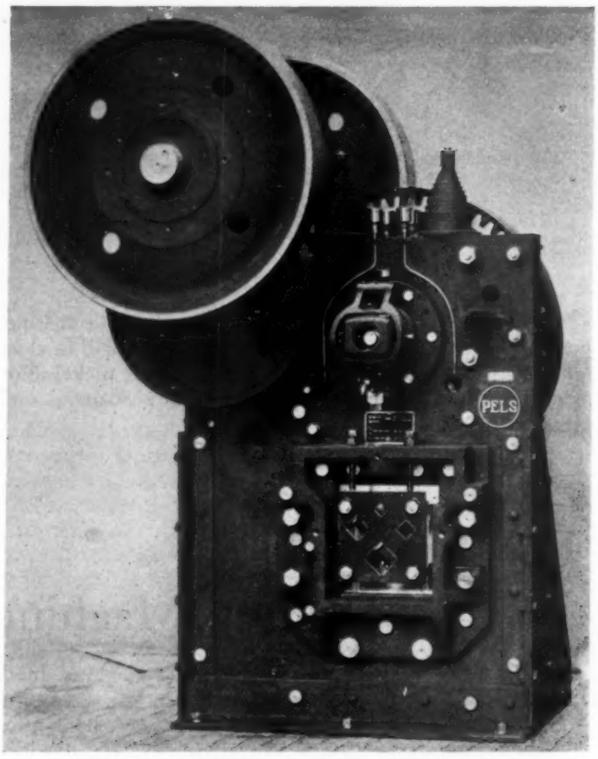
The Elemge Toggle-Lever Riveting Machine

Motor, flywheel, worm wheel and worm run constantly. The engaging of the dog clutch and the starting of the toggle-lever mechanism is automatic, after moving a hand operated lever. The disengaging of the spindle traverse in the two extreme positions of the stroke is fully automatic.

The adjustment of the dies to the thickness of the material to be riveted and the pressure to be exerted is accomplished by means of a long square thread on the riveting spindle. The flywheel contains a safety clutch to protect the machine against overloads and inexpert handling.

Pels Bar and Billet Shears

A BAR and billet shear for cutting rounds, squares, flats, or structural shapes is being exhibited by the Henry Pels & Company, Inc., New York. This machine, designated as type FV-23, has a frame of two heat-treated rolled-steel plates and is equipped with knives designed for quick removal and application.

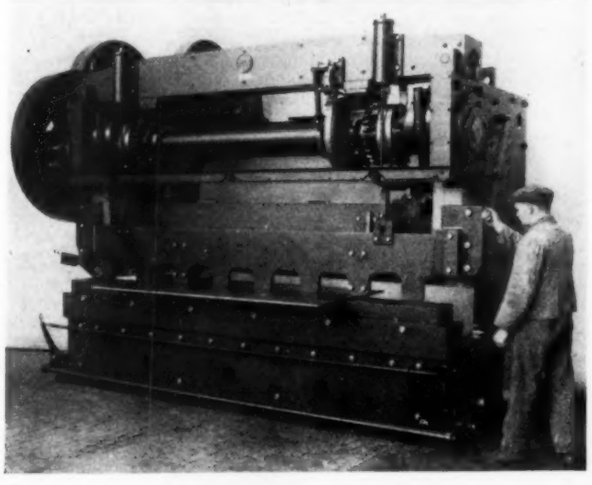


The Pels Type FV-23 Bar and Billet Shears

It is furnished with a clutch which automatically disengages at the completion of each stroke or which can be locked for continuous operation. The shafts and bushings of the machine are precision ground and all bearings have bronze bushings. The flywheel shaft has ring-oiler bearings. It is furnished with double gear reduction, the gears having machine-cut teeth and the pinions being cut from solid steel forgings. A 5½-hp. motor operates the flywheel at a speed of 375 r.p.m. and the shear blades at a speed of 28 strokes per minute. The machine is 57 in. long, 51 in. wide, 79 in. high and weighs approximately 5,500 lb.

Pels Gate Shear

A GATE shear, designated as the type SD-16, which has a 24-in. throat and which is designed to shear 80-in. by 5/8-in. plate, is being exhibited by the Henry Pels & Company, Inc., New York. The frame of this machine is comprised of rolled steel plates. The upper knife is 86 in. long and is set in a holder which is supported all the way across the back of the frame and which is designed to eliminate any deflection of the upper knife. The hold-down device is operated mechanically



The Pels SD-16 Gate Shear

and is constructed to hold the plate so that it will not move while the cut is being made.

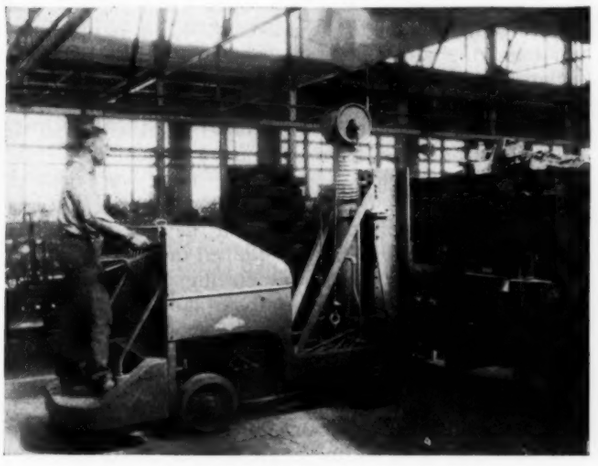
The diameter of the pulley for belt drive is 43½ in. A 25 hp. motor is required for the operation of the machine. It operates at a flywheel speed of 400 r. p. m., which develops, through suitable gearing, fourteen strokes of the blade per minute. The crank shaft is equipped with a band brake to provide a means for stopping the knife at the top of each stroke.

The machine weighs 21,500 lb., is 146 in. long, 89 in. wide and stands 9 ft. 6 in. above the floor. It can be worked intermittently and continuously and designed for either foot or hand operation. The treadle can be locked to guard against unintentional tripping.

The Clark Boom-Crane and Winch Tractor

ond model, 75 in. It is designed to tier 4,000 lb. to a height of 39 in. in 12 sec.

The four-wheel Clarkat is a pushing and pulling type tractor, designed for use at terminals for the handling of



The Clark Tructier

baggage, freight and mail on trailers and, in the shop, for the handling of materials and locomotive and car parts. It has a wheelbase of 37⅞ in., a tread of 34 in., a maximum drawbar pull of 2,000 lb., a speed of ½ to

Clark Gas-Powered Tractor Equipment

THREE gas-powered tractors for use at terminals and transfer stations, in stores and locomotive and machine shops is being exhibited by the Clark Tructractor Company, Battle Creek, Mich. The Clark Tructier, shown handling tote boxes in a railway machine shop, is a gas-driven lifting truck that slips steel fingers under its load, carries it away, lifts it to a height of 3 ft. and tiers it. A similar model lifts to 6 ft. It has an overall height of 70½ in. with platform down and 89½ in. with platform up. The wheelbase of the truck is 50 in. The minimum and maximum height of the platform is 2½ in. and 39 in., respectively, or, in the case of the sec-

The Four-Wheel Clarkat

7½ m. p. h., and is designed to tow, on the level, 25 tons on trailers.

The boom crane and winch tractor is so designed that when the boom is in a horizontal position, the overall height is 7 ft. 10 in. to enable it to negotiate shop, pier and warehouse doors. With the boom elevated to its highest position, the rig is designed to crane 4,000 lb. to a height of 13 ft. from ground to hook. The control for lifting, lowering and neutral is accomplished by one lever. The boom, designed so that it will not move while the load is being craned, may be fixed at any height desired. The hoist has a capacity for handling nearly 500 ft. of ½-in. cable, thus making it available as a winch as well as a boom-type crane. Power is supplied by a standard tractor-type gas engine.

S & N Plate Shear

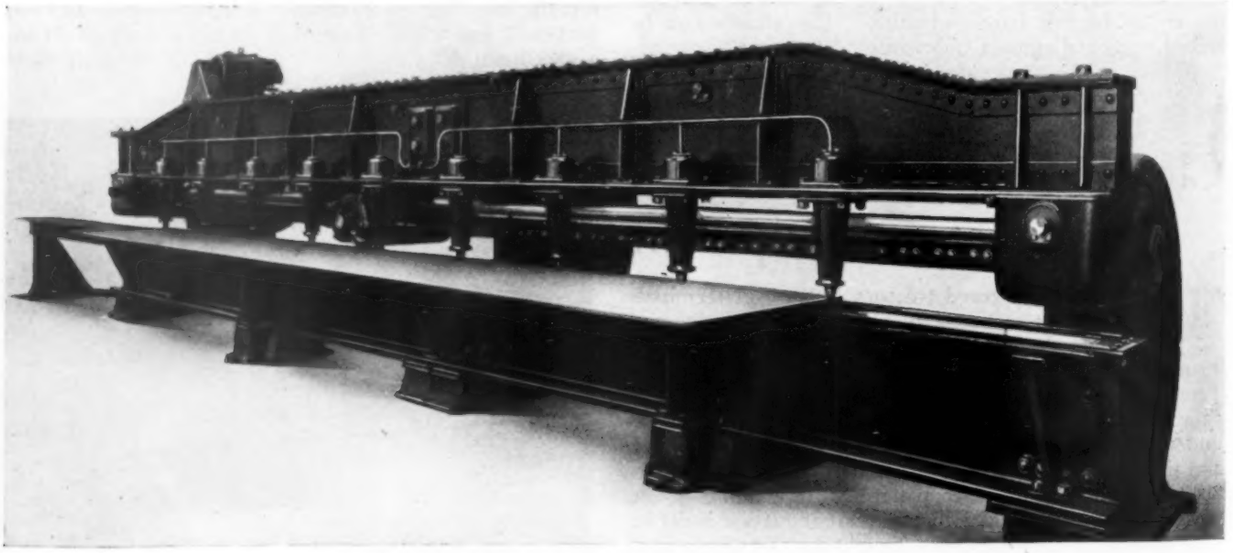
A PLATE shear with a rotary upper knife cutting against a stationary lower knife is being exhibited by the United Machine Tool Corporation, New York. This machine, designated as the S & N plate slitting, trimming and beveling shear model DB-13, has a throat depth of 16 in. and is capable of shearing plates up to ½-in. thick by 120 in. long. Special operations include cutting 18-deg. to 30-deg. bevels on the end of the plate while the plate is lying flat in the machine.

An adjustable block chain, travelling over cut-teeth spur gears, actuates the rotary knife carriage. The carriage is automatically disengaged at the end of its travel in either direction, but can be stopped or started by hand at any point of its travel while cutting. Manually operated jacks are arranged in groups to hold down the plate while being cut. Heavy top and bottom bolsters of forged steel absorb the sheering stresses. These are assembled with the heavy guide shaft which carries the rotary upper knife carriage. The edges of the feeding table are planed to insure straight feeding of material and to secure a parallel cutting edge on continuous operation. The machine is equipped with a 15-hp. motor, controller or push button and rheostat, as well as necessary connecting conductors. The shear is 15 ft. 7 in. long, 5 ft. 7 in. wide, 7 ft. 4 in. high and weighs approximately 14,300 lb.

Buda No. 615 Ratchet Jack

A RATCHET jack which is designed for heavy section-gang service is being exhibited by the Buda Company, Harvey, Ill. It is of 15 tons capacity, double acting, 31 in. high with a 20½-in. rise and weighs 88 lb. The lever socket is made of heat-treated electric tool steel and is cast integral with the side plates. It is designed with fewer parts than the Buda No. 6 jack, which it replaces, and it has the stop for the rack bar located in the base of the jack to eliminate the possibility of the operator catching his finger between the top of the rack and the frame.

The Buda No. 615 Ratchet Jack



The S & N Plate Shear with a Rotary Upper Knife

Railway Age

DAILY EDITION

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Car Men Meet in August

RAILWAY car department officers in attendance at this convention will be interested in the program of the Master Car Builders' and Supervisors' Association convention to be held at the Book-Cadillac Hotel, Detroit, Mich., August 26 to 28, inclusive. This program, which has just been completed, is replete with interesting addresses and committee reports on subjects of the greatest practical bearing on efficient car department operation. Following addresses by R. H. Aishton, president of the American Railway Association, and T. C. Powell, president of the Chicago & Eastern Illinois, the convention will consider ways and means whereby the railroads can improve the quality of service rendered to private-line car owners. Representatives of the A. R. A. Car Service Division and of the Freight Container Bureau, also of the I. C. C. Bureau of Explosives, will make addresses. Among other speakers, three car-department heads will address the association; namely, W. E. Dunham, Chicago & North Western; E. J. Robertson, Minneapolis, St. Paul & Sault Ste. Marie, and M. J. Mills, Pere Marquette.

The Master Car Builders' and Supervisors' Association in the short period of two years has demonstrated a rapid growth in membership and influence which, with the proper guidance, will make it a constructive force for greater car-department efficiency and hence more economical railway operation. It is designed, of course, to serve strictly as a supplementary agency to the A. R. A. Mechanical Division, giving expert attention to certain details of car maintenance and operation not ordinarily included in the work of the older association. Within the field indicated, however, there can be no question of the practical value of the Master Car Builders' and Supervisors' Association, which accordingly deserves the hearty support of the railways generally.

An Opportunity for All Railway Delegates

OF special interest to all railway delegates now in Atlantic City are the sessions of the Motor Transport Division. Here is a comparatively new division which is dealing with a new subject, but one which is already of more or less direct interest to railway officers in many lines of work. All are familiar with the astounding development of motor transportation in recent years and the effect which this has had on the welfare of the railways. The progress of motor transportation has developed many new problems for the railways, but it has compensated for these by providing opportunities for them to effect operating economies and to provide their patrons with improved transportation service.

Co-ordination is the keynote of modern transportation, and this is a subject which the Motor Transport Division is studying. The co-ordination of railway and highway service makes quite essential a knowledge of motor vehicle operating methods and problems by railway officers in all departments, particularly the mechanical and purchases and stores departments. These officers can visit the meeting of the Motor Transport Division conveniently and without conflict with the meetings of their own divisions, since sessions of the former are held in the afternoon as well as in the morning.

Why Neglect the Car Shop?

A CAR man made the remark not long ago that "the car department never got any new shop facilities until everything had been taken care of in the locomotive department". It is possible that on some roads such an attitude exisited until quite recently, but many of the really progressive roads have been devoting serious study to the problem of freight and passenger car repairs. So far, however, the principal effort has been directed to methods rather than facilities until now, in many cases, the shop practices have been developed to such a degree that any further economical output with existing facilities is practically impossible.

The car shops on many roads are now in much the same position as were the locomotive departments seven to ten years ago. At that time many mechanical officers held the opinion that the best policy was to expect increased output as a result of greater effort on the part of the organization rather than to consider the time and labor saving possibilities of modern shop equipment. The past 10 years, owing principally to important

changes in operating conditions, have created demands for increased output from locomotive shops and engine terminals that were far beyond the ability of the shop organizations to meet, with the result that the railroads were forced to turn to improved facilities as a means of keeping pace with traffic demands.

The locomotive shop, and more recently the modern engine terminal, now provide a background that will show what an important factor modern shop facilities are in relation to the economical maintenance and operation of motive power. The same observation can hardly be made of the car shop with the exception of a very few recently-built plants. Is it not possible that some real opportunities to effect substantial economies in mechanical department operation have been overlooked in the failure of many roads to consider the modernization of car repair facilities equally as important as modernization of their locomotive facilities?

Fitting Materials to Service

ONE of the major problems that railroad mechanical men have been obliged to solve in relation to steel car maintenance has been to develop designs and select materials that will increase the average service life of a car between shoppings for rebuilding. Experience over the past few years has demonstrated that, as far as the superstructure of a steel car is concerned, the average life between rebuilding periods will vary from 10 to 12 years, depending on the class of service and the materials used in the construction of the car body. It has also been determined that the modern cast-steel side frame freight car truck will render from 25 to 30 years of service, except for periodical renewals of such minor parts as journal brasses, wheels, and certain brake rigging units. Under present conditions, therefore, the car must be taken into the shops for rebuilding the superstructure on an average of two and one-half times during the life of the trucks.

Many roads are making studies of steel car maintenance problems with a view to increasing the average service life of the cars from 12 to 15 years. There seem to be two serious enemies to longer life of steel cars, particularly in relation to hopper cars—abrasion and corrosion. The studies also indicate that these enemies attack the car structure principally at or below the location of the side sills and that the average service life of car sheets in other areas than these is materially greater than 10 to 12 years. Why, then, is it not logical to consider the introduction of different materials in the area attacked by these agents of deterioration that will at least delay their destructive effect?

The past five years has witnessed the development of many new materials that might profitably be adapted to car construction in an effort to increase the average service life of cars. Present car construction and repair costs are so well known that it is not a difficult matter to estimate the savings that could be effected by an increase of even three years in average service life. In some cases the higher cost of corrosion-resisting materials has been a deterrent when the idea of building an entire car of these materials has been considered. There seems to be something worth while in the suggestion that there are possibilities of building the different parts of a car superstructure with materials especially suited to the service conditions they must meet

Standards and Car Lumber Prices

IF THE Purchases and Stores Division had done nothing else on Wednesday but take the action it did with reference to the propriety of railways using certain new national standards governing car lumber, it justified in a large measure the year's work, provided the Mechanical Division agrees to this action. The question hinges upon an apparently simple detail of alternate standards in lumber buying, but is of first importance because, in the minds of men who really know lumber, the railways stand to save thousands of dollars a year in their lumber costs, should the recommendations receive affirmative action.

The present specifications governing the purchase of certain car and other lumber on railways are the M. C. B. specifications of 1910, which do not conform to present national lumber standards. In 1928 the Mechanical Division, appreciating the desirability of using national standards to the largest extent possible, adopted alternate standards, which were in harmony with the standard patterns for flooring and other yard lumber now prevailing in the lumber industry, and which at the same time were in harmony with the moisture content restrictions adopted by the Mechanical Division in 1926. These alternate standards have been on trial for about two years and apparently are acceptable but have not been put into use extensively because of the question as to their relative cost. Their final adoption by the Mechanical Division apparently depends on their being purchasable by the railways at a lower cost than the M. C. B. patterns.

The Purchases & Stores Division was asked to determine whether or not a reduction of price was possible. The Committee on Forest Products investigated and found that the new patterns would cost from two to three dollars per thousand board feet less where the lumber is fir and from one to two dollars less than the M. C. B. patterns where the lumber is pine, in all cases where the comparisons made on the basis of an equivalent moisture content.

The alternate standards can be purchased at lower prices than the old standards. In view of this fact it would seem that the Mechanical Division should profit by the findings of the Purchases & Stores Division and adopt the alternate standards.

The Hot Box Problem

CONGRATULATIONS are due the Committee on the Lubrication of Cars and Locomotives for the excellent work it has done in furthering a solution of the hot-box problem. The need for effective lubrication of both cars and locomotives is becoming more urgent, as pointed out in this year's report, due to the increased speeds and distances at which trains are being operated. A hot-box today is a source of much more expense than it was a few years ago.

Rule 66 has been in effect now for practically six months and, according to all reports, is working satisfactorily, except in a few isolated cases, where there has apparently been a disposition to avoid meeting the requirements of the rule. It has been observed that the car mileage per hot box on those roads which interchange most of their cars with roads that are honestly

endeavoring to live up to the requirements of Rule 66, has increased since the first of the year. Several systems of renovating used packing have been developed which produces packing of such quality that many roads consider it better than packing made of new materials. Meeting the requirements of Rule 66 has required practically every railroad on the North American continent to make a special study of the hot-box problem, and, as a result, considerable progress has been made toward eliminating mechanical defects as well as lubricating defects. More thorough education and closer supervision of the men inspecting cars and packing boxes has been an important factor on many roads toward securing increased car mileage per hot-box.

However, much remains to be done before anything like satisfactory conditions of car lubrication will have been established. The problem of furnishing good lubricating materials has yet to be solved by a number of railroads. Many roads which are packing foreign cars with new oil and waste will find their box-to-box costs running pretty high. Also some roads will find the practice of doing a good job when packing foreign cars and at the same time using an inferior grade of reclaimed packing on their own cars rather expensive. A number of roads are refusing to pay bills for repacking boxes with reclaimed or renovated packing. Others will pay such bills if permitted to obtain samples of the oil and waste at the renovating plant of the road which has repacked the boxes. Although the A. R. A. has adopted a definition for a hot box, there are a number of roads which are not recording their hot boxes according to that definition. Quite a few roads are still estimating their lubrication costs on the basis of new oil used instead of ascertaining their costs according to Account 402, which covers the cost of inspecting, renovating, repacking and oiling car journal boxes.

If the statements that have been made by car-department officers at meetings of the various car department associations and railroad clubs during the past four or five months can be taken seriously considering recent developments, the Arbitration Committee will have plenty of work in deciding cases under Rule 66. What may be needed to make the rule effective will be a provision whereby bills can be refused for repacked boxes which must be packed again, say within sixty days.

These are some of the more pertinent problems pertaining to car lubrication. The Committee on the Lubrication of Cars and Locomotives is now working on the problem of securing an oil suitable for all-year service. This is another step in the right direction. The committee has shown real courage in its recommendations and it has been properly supported by the Mechanical Division, even though many railroads have considered some of its recommendations quite drastic. What is needed right now more than anything else is complete cooperation from all the railroads by actual performance in not only obeying the letter of the rule, but living up to the spirit as well.

The Programs for Today

THE programs of the Purchases and Stores, the Mechanical and the Motor Transport divisions of the American Railway Association, all of which meet in the Auditorium today, are as follows:

Purchases and Stores Division

The Purchases and Stores Division meeting room is at the left of the stage in the main Exhibit Hall of the Auditorium. The session will last from 9.00 a. m., daylight saving time, to 1.30 p. m. The program follows:

Individual Paper—"Visible Card Stock Control Record," by C. B. Tobey, General Storekeeper, Lehigh Valley Railroad.
Subject 6—Purchasing and Storekeeping for Motor Bus Operation.
Subject 12—Purchasing Agents' Organization, Practices and Office Records.
Subject 13—Stationery and Printing.
Individual Papers—Annual Contest:
"Is Turnover Always of Primary Importance?" by Paul H. Day, Requisition Clerk, Bangor & Aroostook Railroad, Derby, Maine.
"Products and By-Products of Certain Purchasing Methods," by H. W. Rolston, Statistician, Office of Purchasing Agent, The Pennsylvania Railroad.
Subject 14—Fire Prevention.
Subject 15—Motorized and Unified Delivery and Distribution of Materials.
Subject 16—Standardization and Simplification of Stores Stocks.
Individual Paper—"Handling Signal Material," by A. P. Pollard, Traveling Storekeeper, Boston & Maine Railroad.
Subject 19—Capacity Loading and Prompt Handling of Company Materials Cars.
Subject 22—Selection and Training of Employes in Purchasing and Stores Departments.

Mechanical Division

The Mechanical Division meeting, in the room to the right of the stage in the main Exhibit Hall of the Auditorium, will be called to order at 9.30 a. m. and will adjourn at 12.30 p. m. The program follows:

Address: W. P. Borland, Chief Bureau of Safety, Interstate Commerce Commission.
Individual Paper: Freight Car Inspection Pit, by R. L. Kleine, Asst. Chief of Motive Power, Pennsylvania Railroad System.
Discussion of Reports on:
Arbitration Committee.
Committee on Prices for Labor and Materials.
Committee on Loading Rules.
Committee on Tank Cars.
Brakes and Brake Equipment.
Committee on Wheels.

Motor Transport Division

The Motor Coach Section of the Motor Transport Division will meet in Room 12 of the Municipal Auditorium at 9.30 a. m. There will be no afternoon session. Room 12 is adjacent to the gallery above the ball room in the Auditorium. Follow the signs and you cannot go wrong. The program follows, P. J. Neff, chairman of the Motor Coach Section, presiding.

Reports of Regional Chairmen on the following subjects:
1. Can Motor Coach service be profitably substituted for branch line passenger train service?
2. What is the trend and extent of long haul bus transportation as compared with long haul rail transportation?
3. What is approximate total cost per bus mile of operating short and long haul runs?
4. What steps should be taken to regain passenger traffic?

Entertainment

10.30 A. M.—Orchestral Concert, Ball Room. William Klaiss, Feature Pipe Organist. Indoor Golf.

3.30 P. M.—Orchestral Concert, Ball Room. Impromptu Dancing. William Klaiss, Feature Pipe Organist. Indoor Golf. Ladies' Bridge Party.

9.30 P. M.—Grand Ball, Ball Room. Mae Mackie, Contralto, Philadelphia Civic Opera Company. William Klaiss, Feature Pipe Organist. The Four Melody Harmonists.

Cornell Alumni Meeting

THE customary meeting of the Cornell alumni attending the conventions will be held at the Hotel Traymore on Friday evening at 8 p. m. Those desiring to attend who have not already registered are requested to leave their names with A. F. Stuebing at the Bradford Corporation, booth No. 222.

Transportation Committee Meeting

CHAIRMAN Ralph Brown of the Transportation Committee has called a meeting of that committee at its headquarters in the Auditorium at three o'clock on Thursday afternoon. This is in place of the meeting that was to have been held on Friday afternoon. Among other things a group photograph is to be taken and the members are urged to be on hand sharp on time.

Russia Represented

SECRETARY W. J. Farrell of the Purchases and Stores Division, has received a letter from G. D. Ulanov, a supply officer of the Russian railways, stating that he will attend the sessions of the Purchases and Stores meeting, together with five other Russian supply officers, as follows: S. A. Bogdanov, L. S. Lebediansky, N. A. Kazantseff, N. Luibomudrov and M. F. Vladimirov.

Entertainment Committee Meeting

AN important meeting of the Entertainment Committee is called for 11 o'clock this morning at its headquarters in Room 1. In addition to important matters which will come up for consideration a photograph will also be made of the group.

P. & S. Committees

AT THE opening session of the Purchases and Stores meeting on Wednesday, the following appointments were made by the chairman:

Sergeant-at-arms: B. T. Adams, assistant general storekeeper, Illinois Central.

Assistant Sergeant-at-arms: G. W. Alexander, assistant general storekeeper, Central of Georgia.

Committee on Resolutions: James Deery (chairman), assistant purchasing agent, Pennsylvania; E. W. Walther, general storekeeper, Baltimore & Ohio; I. H. Lance, general storekeeper, Delaware, Lackawanna & Western; A. S. Thompson, purchasing agent and storekeeper, Columbus & Greenville; and L. L. King, assistant purchasing agent, Illinois Central.

Committee on Memorials: T. H. Ryan (chairman), assistant purchasing agent, Wabash; C. R. Painter, purchasing agent, New York, New Haven & Hartford; W. E. Rawson, assistant general storekeeper, Southern Pacific, Texas and Louisiana Lines; M. E. Baile, assistant supply agent, Missouri Pacific; and H. M. Dewart, purchasing agent, Central Vermont.

Bridge Champions

DURING the 1928 convention Major Walter C. Sanders, general manager, Railway Division, Timken Roller Bearing Company, and Harold N. Ransome, vice-president, Waugh Equipment Company, won the bridge championship. Major Sanders and Mr. Ransome, who are members of the Knickerbocker Whist Club, New York, are ready to defend the championship against all comers.

An Exhibitor Overlooked

THROUGH an oversight the *Railway Age* neglected to mention the Johns-Manville Sales Corporation in the list of exhibitors published in yesterday's *Daily*. The data as to its exhibit follow:

Johns-Manville Sales Corporation, New York.—Car insulation and flooring; packing; roofing; heat insulating materials; asbestos products; Transite corrugated roofing and siding; boiler lagging; train pipe covering; friction materials. Represented by G. A. Nicol, C. S. Clingman, P. D. Mallay, R. P. Townsend, H. Flannagan, J. D. Johnson, L. Papineau, T. O'Leary, J. H. Trent, B. J. Queen and C. E. Bryant. Spaces 51, 53 and 55.

Lost

BADGE 5003, Mrs. J. M. Griffin, care of Wheel Truing Brake Shoe Company, Space 111; Badge 5208, Mrs. W. J. Roehl, Traymore Hotel, and Badges 7077 and 8027. Please return to the owners or to the Enrollment Booth.

Railroad Division, A.S.M.E., Plans

THE Executive and General Committees of the Railroad Division, American Society of Mechanical Engineers, met Tuesday evening under the chairmanship of A. F. Stuebing, chief engineer, Bradford Corporation, at the Marlborough Hotel and discussed the plans and activities of the division for the coming year. Two subjects of importance were discussed; namely, How can the large amount of engineering information and technical data which has been compiled from many sources all over the world be assembled so that it can be readily accessible to the railroad mechanical department officer; and the establishing of an award for the best technical paper prepared by a special apprentice or equivalent thereof employed by a railroad or railway supply company.

The following were present at the meeting: A. F. Stuebing (chairman), Paul D. Mallay, (secretary), Johns-Manville Sales Corporation; C. E. Brooks, chief of motive power, Canadian National; A. G. Trumbull, chief mechanical engineer of the Advisory Committee, Chesapeake & Ohio, Erie, etc.; George Hillyer, Jr., mechanical engineer, Southern; C. B. Peck, managing editor, Railway Mechanical Engineer; L. K. Sillcox, vice-president, New York Air Brake Company; Lawford Fry, railway engineer, Edgewater Steel Company; and Marion B. Richardson, associate editor, Railway Mechanical Engineer.

Mechanical Divisions Committees

DURING the session of the Mechanical Division on Wednesday Chairman Smart made the following appointments to the Committee on Subjects: A. G. Trumbull, (Erie); J. Purcell, (A. T. & S. F.); J. A. Powers, (Southern Pacific); C. T. Ripley, (A. T. & S. F.) and E. B. Hall, (C. & N. W.).

On the Committee on Resolutions the following were appointed: R. L. Kleine, (Penna.); F. W. Brazier, (N. Y. C.), and C. E. Chambers, (C. N. J.).

The personnel of the Committee on Obituaries will be announced later.

Registration Figures

YESTERDAY'S registration figures up to the middle of the afternoon totaled 3866, as compared with 3,826 for the first day of 1928. No complimentary badges are being issued this year as such. They are included in the records as Special Guests. Below are the comparative first day figures for the last five years:

	1922	1924	1926	1928	1930
Mechanical, Division V	360	435	600	450	520
Purchases and Stores, Division VI	13	8	330	318	282
Motor Transport, Division VIII				13	47
Railroad Guests				32	272
Railroad ladies	148	337	450	549	483
Supply men	1140	1676	2050	1837	1813
Supply ladies	281	380	500	434	346
Special guests	107	182	175	16	103
Complimentary				177	
Total	2049	3018	4105	3826	3866

P. & S. Promotions

THERE have been over 50 changes of consequence in the positions of railway purchasing and stores officers since the last convention, as a result of which several of the active members in the affairs of the Purchases and Stores Division are now functioning under new titles.

Shortly after the convention at San Francisco F. W. Mahl, general purchasing agent of the Southern Pacific, Pacific Lines, retired and was succeeded by F. W. Taylor. About the same time H. L. Taylor, assistant purchasing agent of the Canadian National at Winnipeg, was promoted to purchasing agent at Vancouver, B. C. In August, H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio and the Hocking Valley, and also Jack Mahaney, superintendent of stores of these roads, moved their headquarters from Richmond, Va., to fine new quarters in the Terminal Tower Building at Cleveland, Ohio, to include within their jurisdiction the Pere Marquette.

J. C. Neph, who was general inspector of stores of the Southern Pacific, Pacific Lines, at the time of the last convention, and who is chairman of this year's committee on handling supplies for motor coach operations, has received an advancement in the form of his appointment to purchasing agent and general storekeeper of the Pacific Transportation Securities, Inc., a responsibility, incidentally, which has made it impossible for him to be present at the convention to present his report.

J. M. Day, foreman of stores on the Southern Pacific at Oakland, Cal., and who will be remembered as a winner in one of the Division's essay contests, has been advanced to assistant district storekeeper, while W. E. Rawson, district storekeeper of the Louisiana and Texas Lines of the Southern Pacific at Houston, Tex., has been advanced to assistant general storekeeper, pursuant to the appointment of K. P. Chinn, another well-known member of the association, to trainmaster.

Death Takes P. & S. Members

SINCE the last convention the Purchases and Stores Division has lost several of its members through death, as follows: O. H. Wood, assistant purchasing agent, Great Northern, Seattle, Wash.; J. L. Meredith, stationer, Central of New Jersey, Jersey City, N. J.; N. M. Rice, vice-president, New York, New Haven & Hartford, New Haven, Conn.; J. White Spring, purchasing agent, Delaware & Hudson, Albany, N. Y.; H. S. Hunt, chief clerk, purchasing department, Delaware & Hudson, Albany, N. Y.; V. R. Plank, stationery storekeeper, Southern Pacific, West Oakland, Calif., and W. W. Fulmer, general purchasing agent, Railway Express Agency, Inc., New York.

The death of Mr. Sprong, who was active in the first attempts by purchasing agents to maintain an association fifty or more years ago, leaves F. C. Fechtig, purchasing agent of the Atlantic Coast Line, the unquestioned title of dean of railway purchasing agents still in active service.

The members of the association especially miss Mr. Plank, who will be recalled as the past chairman of the Committee on Stationery and Printing and the genial stationer of the Southern Pacific plant at Oakland, Calif., where, under his supervision, even footprints on the floor were conspicuous by their absence.

Golf

E. M. HARSHBARGER, chairman of the Golf Committee, has issued routing directions to both the Atlantic City and Linwood Country Clubs as follows: To reach the Country Clubs take the Somers Point bus which leaves the corner of Tennessee and Atlantic avenues on a regular schedule. A bus can be taken at any point on Arctic avenue. If driving, take the following route to the Atlantic City Country Club: Go down Atlantic avenue to Albany avenue boulevard, turn right on Albany avenue boulevard; down Albany avenue boulevard to Pleasantville

(about six miles from the auditorium); turn left, half mile, to Atlantic City Country Club. If driving, take the following route to the Linwood Country Club: From Atlantic City over Albany avenue boulevard; turn left at Pleasantville and continue on Shore Road; pass golf course on left, one and one-half miles from turn, and continue one mile to Linwood Country Club.

Mr. Harshbarger also has a supply of Courtesy Cards which may be obtained from him at the SKF Industries Booth, 370.

New Life Members of Mechanical Division

IN ITS report presented at the opening session of the Mechanical Division convention Wednesday, the General Committee presented the names of twenty-three persons who have been made life members of the division during the past year. With one exception, these members have acquired the distinction of the life membership under the provision of the rules of order which automatically places them in this rank after thirty years of membership in the division, or one of its antecedent associations. The exception to the thirty-year rule is George E. Smart, chief of car equipment, Canadian National. The honor comes to Mr. Smart by virtue of the completion of his term as chairman of the division. Owing to the resignation of L. K. Sillcox during Mr. Smart's term as vice-chairman, he has carried on the duties of the chairman's office through three conventions—the second convention of Mr. Sillcox's term and the two during his own term as chairman.

The list of new life members is as follows:

Date Joined	*Name*	*Title and Railroad*
1910	Ayres, A. R.	General manager, New York, Chicago & St. Louis.
1910	Bennett, W. H.	(Retired), Juniata, Pennsylvania.
1910	Booth, J. K.	General foreman, Bessemer & Lake Erie.
1910	Fryer, C. V.	General car foreman, New York, Ontario & Western.
1910	Gardner, Henry.	(Retired), 605 Edgevale road, Baltimore, Md.
1910	Grewe, H. F.	Superintendent of motive power, Akron, Canton & Youngstown.
1910	Hassett, M. W.	Assistant Superintendent of motive power, New York Central.
1910	Hatch, M. C. M.	General mechanical superintendent, Missouri-Kansas-Texas.
1910	Henry, J. M.	Assistant chief of motive power, Pennsylvania.
1910	Jones, C. H.	Master mechanic, Huntington & Broad Top Mountain.
1910	Keiser, C. B.	Assistant General Superintendent of motive power, Pennsylvania.
1910	Kiesel, W. F., Jr.	Mechanical engineer, Pennsylvania.
1910	Kipp, A.	General car inspector, New York, Ontario & Western.
1910	Knox, W. J.	Mechanical engineer, Genesee & Wyoming.
1910	Maupin, J. D.	Superintendent of motive power, Trinity & Brazos Valley.
1910	Munroe, J. T.	(Retired), shop superintendent, Erie.
1910	O'Brien, W. J.	Superintendent of motive power, New York Central.
1910	Nash, J. H.	Superintendent of motive power, Illinois Central.
1910	Painter, J. H.	Master mechanic, Atlantic Coast Line.
1910	Senger, J. W.	Superintendent of rolling stock, New York Central.
1918	Smart, G. E.	Chief of car equipment, Canadian National (past chairman).
1910	Walsh, G. B.	(Retired), New York Central.
1910	Warthen, H. J.	Superintendent of motive power, Richmond, Fredericksburg & Potomac.

Conventionalities

Among the families well represented on the Boardwalk is that of V. R. Hawthorne, time-honored secretary of the Mechanical Division, who is accompanied this year not only by Mrs. Hawthorne, but by their three daughters.

The Hunt-Spiller boys are initiating B. B. Mills, a new member of the automotive division, to the convention this year. Pick out the best looking fellow in the proverbial Hunt-Spiller convention suit and you'll have him.

O. H. Neal, of the New York office of the Union Asbestos & Rubber Company who has been a regular attendant at these conventions for many years, has been convalescing at Tucson, Ariz., for the past six months. He is reported to be recovering rapidly.

As George Cooper loomed up in the offing yesterday, a discussion occurred as to whether he had adopted the modern fad of reducing. The result was a small wager, which George settled by testifying that he had succeeded in reducing his avoirdupois from 317 lb. to the midget dimensions of 284 lb.

Lawford H. Fry is attending the convention this year in a new capacity, as railway engineer of the Edgewater Steel Company. He took up his new work a few weeks ago, after having been in the service of the Baldwin Locomotive Works and the Standard Steel Works Company for 32 years.

J. M. Motherwell, vice-president and general manager of the Ashton Valve Company, is continuing with his local civic interests. He is now president of the Cambridge Industrial Association, which is a unification of the Kendall Square Business Men's Association and the Chamber of Commerce of Cambridge, Mass.

Paul D. Mallay, of the Johns-Manville Sales Corporation, arrived Monday. He is secretary of the Railroad Division of the American Society of Mechanical Engineers and was busy making the final arrangements for the joint meeting of the Executive and General Committees of the Railroad Division, which was held at the Marlborough Hotel on Tuesday evening.

F. W. Dickinson, master car builder, Bessemer & Lake Erie, and Mrs. Dickinson of Greenville, Pa., arrived in Atlantic City Wednesday. Not many folks know that Mr. and Mrs. Dickinson are the parents of Tom Dickinson, storekeeper of the B. & L. E. at Greenville. Both F. W. and Tom have been regular attendants at the conventions for many years.

The many friends of Jim (J. E.) Gardiner will be interested to learn that he has resigned his job as air brake inspector of the Boston & Maine to become a sales representative for the Bustin-Bacon Manufacturing Company. Jim has been an active member of the Air Brake Association for many years, and has served on the Executive Committee for the past two

years. His going into the supply business will develop keen competition for Tom O' Leary of the Johns-Manville Corporation, J. K. Aimer of the Reading Iron Company and E. H. Weaver of the Westinghouse Air Brake Company, in running for office in the Air Brake Appliance Association.

John H. Rodger, who attended the last convention as vice-president of the Safety Car Heating & Lighting Company, is attending this year's meetings as executive vice-president of the Oxweld Railway Service Company, to which he was promoted about six months ago. His promotion was part of official changes made following the death of Charles B. Moore, chairman of the board of the Oxweld Company.

D. F. Crawford has recently recovered from an operation for appendicitis. He was appointed one of the United States government delegates to the International Railway Congress at Madrid, Spain, but his illness prevented him from attending the Congress. He is entirely well now, and has been taking his ease on his beautiful farm, which is located about fourteen miles from Pittsburgh. He was renewing acquaintances among his many friends at the convention yesterday.

Mr. and Mrs. Charles D. Jenks will sail for Europe following the conventions and will visit, while over there, with Mr. and Mrs. Pierre G. Jenks. In connection with the combination of the Pullman Company and the Standard Railway Steel Car Company, which followed upon the death of John Hansen, chairman of the latter company, Pierre Jenks, who was vice-president of the Standard at Chicago, went to Paris to take charge of its large European business.

Since Norman C. Naylor last came from Chicago to attend the conventions at Atlantic City, he has been promoted from district sales manager of the American Locomotive Company and the Railway Steel Spring Company to vice-president in charge of western sales of these companies. The many friends of the Naylors at the conventions will be pleased to learn that, following a recent operation, Mrs. Naylor is rapidly recovering her health.

This is Albert P. Withall's first convention as president of W. H. Miner, Inc. He is receiving many expressions of congratulations and best wishes. Many years ago Mr. Withall was in charge of the mechanical department of the Chicago, New York & Boston Car Lines. Later this business was reorganized as the Whipple Car Company at Chicago. Seventeen years ago Mr. Miner asked Mr. Withall to go with him in business; the offer was accepted. Mrs. Withall is with her husband at Atlantic City.

One of the outstanding figures in the railway supply industry, and a man well known in both the railway and supply fields, will be sincerely missed at the conventions and among the exhibitions this year. William H. Miner, president of W. H. Miner, Inc., died at Plattsburgh, N. Y., April 3 of this year. He passed away in the Physicians' Hospital at Plattsburgh, a fine institution which he established in 1910 and which he rebuilt in 1926 as one of the most modern institutions of its kind in the United States.

George R. Carr, Locomotive Firebox Company, has become in the last few years almost a regular commuter across "the deep pond," as Maurice Chevalier calls the Atlantic Ocean. Mr. Carr was one of the American (government) delegates to the International Railway Congress at Madrid, Spain, in May. He arrived in New York Tuesday of this week on the Olympic and at once came to Atlantic City. While Mr. Carr was in London, Mrs. Carr was presented to the King and Queen of England at Buckingham Palace. Making the return passage on the Olympic were Mr. and Mrs. C. H. Ewing and Mr. and Mrs. W. D. Wiggins. Mr. Ewing is vice-president of the Reading Railroad and Mr. Wiggins is chief engineer of the Pennsylvania. Both of these gentlemen were government delegates to the Railway Congress at Madrid.

Charles Riddell, manager of the Baldwin Locomotive Works at Chicago, by his inability to be at Atlantic City this year, has missed his first convention in thirty years. Mr. Ridell sends greetings to his many friends, who will be sorry that he has been compelled to break such an attendance record, antedating as it does the holding of the conventions and exhibits at Atlantic City by several years.

It is hard to believe, but A. L. Humphrey, president of the Westinghouse Air Brake Company, has recently celebrated his seventieth birthday. His birthday was on June 12 and on the evening of that day he was given a dinner at the Duquesne Club in Pittsburgh. There were about one hundred guests and, excepting for Mr. Humphrey's two sons, they consisted entirely of present or past officers and directors of the Westinghouse Air Brake Company and the Westinghouse Electric & Manufacturing Company. A. W. Robertson, chairman of the Westinghouse Electric & Manufacturing Company, was chairman of the dinner, and remarks were made by W. L. Monroe felicitating Mr. Humphrey on having reached his seventieth mile-stone in good health and the full enjoyment of work and life.

"High Hat Brigade"—Five of the ten U. S. Government Delegates to the International Railway Congress at Madrid. Reading from left to right they are: George R. Carr, chairman, Locomotive Firebox Company; A. S. Merz, vice-president, Standard Railway Equipment Co.; Colonel E. A. Simmons; Fred A. Poor, president, The P. & M. Company; James B. Strong, president, Ramapo Ajax Corporation.

Members of the General Committee of the Mechanical Division, American Railway Association

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Mechanical Division Opens Eleventh Annual Meeting

Addresses by R. H. Aishton and Chairman Smart Inaugurate Sessions of Division V

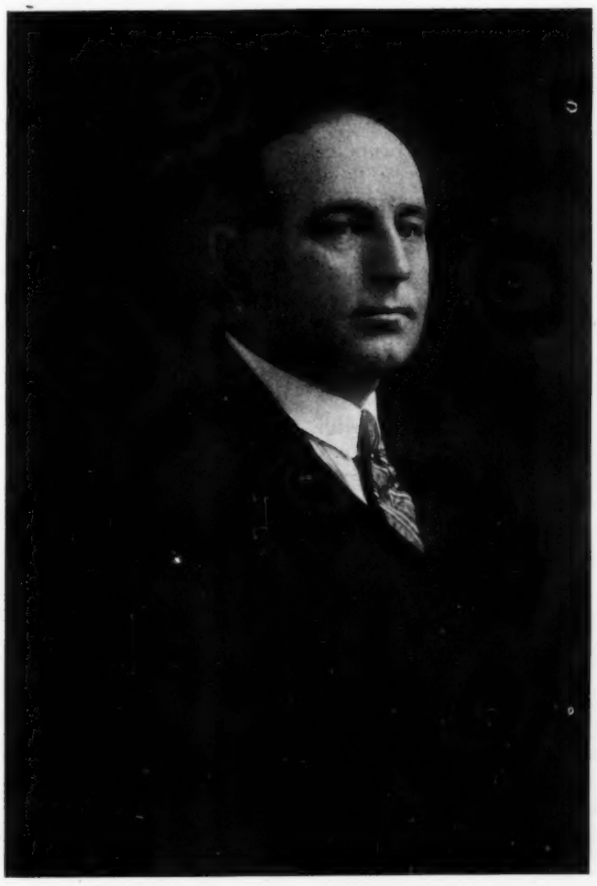
THE eleventh annual meeting of the American Railway Association, Mechanical Division, was called to order by G. E. Smart, chairman of the division and chief of car equipment of the Canadian National, at 9:30 yesterday morning at the new Atlantic City Municipal Auditorium. The invocation was offered by the Rev. Dr. Charles D. Sinkinson of Christ Methodist Protestant Church. This was followed by addresses by Chairman Smart and R. H. Aishton, president of the American Railway Association.

Address of Chairman Smart

It is pleasing to see such a large attendance this morning. It shows the interest the railroads are taking in the association when they send members here to represent them at this convention. It is also very gratifying to the chairmen and members of the committees who worked so hard marking up the standards, and it is only fair to them, when the papers are read here each morning, that you discuss them fully.

Our last meeting was held at Los Angeles. We had a splendid meeting and a good attendance. We have now held these meetings at Atlantic City in the extreme east, Chicago in the middle west and across the border in Montreal, Canada. This shows to what extent our association is interested in holding these meetings in the different sections of the country so as to be fair to the members and the railways they represent.

Transportation made it possible to open up this vast and beautiful North American continent and, as many of us know, you can travel by rail not only from the east to the west, but from the extreme south to the Hudson Bay in the arctic circe. Many improvements have been made in transportation, and passengers travel today in luxury as compared with a few years ago. This is accomplished at greater speed and safety, due to the modern equipment that railways provide, the designs of which have been improved, special attention being given to the trucks, couplers, draft gear, brakes and general designs of cars. This refers not only to passenger equipment, but to freight equipment, to which much attention has been given. Compare the modern freight cars with the cars built a few years ago; there is no comparison. One of the most important changes is the adoption of the cast-steel side-frame trucks, the design of which has been improved in recent years and, because of modern shop practice, the railways can obtain these at no greater expense than the old arch-bar truck. The improved design of freight equipment has also assisted in the speeding up of freight trains and the delivery of their commodities to consignees. I am glad to say that the railways are adopting the designs of the standard cars that your committee has prepared for them.



G. E. Smart
Chairman, Mechanical Division

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There has been considerable improvement in locomotive design. Years ago the railways designed and built them largely on tractive force, but today they are obtaining real power. The speed factor is now one of the most important questions, which, combined with extended runs, has forced the locomotive designer to give more careful consideration to the question of lubrication, finer detail finish, larger tenders, etc.

The cost of fuel demands strict economy, hence the development of many well-known auxiliaries. The present measuring stick of gross ton miles per train hour, demands a greater speed.

Great advance has been made in problems confronting the locomotive designer. One of these problems has been the efficient generation and utilization of steam, since the problem of the rail-

roads in providing efficient transportation starts with the purchase of fuel. The locomotive designers' problem is to utilize this fuel in order to convert it to efficient mechanical energy.

Special consideration is being given to reducing ton miles per hour costs by means of improved locomotives and coordination of the locomotives into the rapidly developing scheme of efficient railway operation. In the past few years there has been considerable development in locomotive and car-shop design, to keep up with the larger and heavier equipment the railways have to maintain.

While much energy has been expended towards improving cars and locomotives and mechanical facilities for handling them, it is interesting to note that the important factor of the human element has not been lost sight of. Improved morale and working conditions have been brought about as a result of confidence created through closer contact between railway managements and employees.

Before closing my remarks I want to say a few word on behalf of the manufacturers of railway equipm nt. They have a wonderful exhibit here this year and have gone to a great deal of expense in preparing this for you. We must realize the manufacturers are of great assistance to us in solving many of our engineering problems, and in fairness to them and the railways we represent, we should take every opportunity to see the exhibits during our stay at Atlantic City. Our meetings will be held during the forenoons only. It will be up to me to see that these are conducted to the best advantage, so I sincerely ask you to be here promptly each morning. Let us have a good attendance and full discussion on all papers.

Address by R. H. Aishton

A. R. A. President Predicts Greater Progress in Next Ten Years Than in the Last Twenty Years

R. H. Aishton

It is needless to say that I am glad to be here with you. It is an additional pleasure to be here with you in this magnificent auditorium.

I want to suggest to your future meetings, if you are kind enough to ask me to come to them, that in place of making me a keynote speaker, you leave it to me to announce the benediction, or better still if you have any place where you want a fellow who can sound a good, profound, loud speaking "Amen," why, put me in one of the back seats, and I will get the "Amen" in the right place.

I have found this out, though, about the Mechanical Division: You do not have any "Amen" men in it. An "Amen" man is pretty good in church but when it comes to public discussion you do not want him. You want men who have the courage of their convictions and who will come out and express them. If your committees make some reports with which you do not agree you will come up here and make them take it back, and furthermore when you reach conclusions at your meetings here and have voted "aye", you won't go home and say "Amen" then, but you will go home and do business.

You gentlemen have many problems and you realize, I think, more than anybody else, that progress is not alone in keeping step with each day, but in anticipating the future, and there never was a time in the history of American railroads when it was so necessary for you gentlemen who are responsible for these various activities, to look ahead, to plan ahead, and to investigate ahead. I don't know of any time in my recollection when competition between the railroads was so intense as it is today, and when I say competition, I don't mean what you generally think of competition as wasteful competition, but in the friendly and helpful competition which has one object in view, that is, a better transportation service for the public by taking advantage of all the things that bring about better conditions, bring about greater efficiency and economy, greater utilization of the plant, greater improvement of terminal facilities and particularly added safety for the public and employees.

I picked up the *Railway Age* the other day and read this little clipping in it quoting an article from the *Railway Age* of June 10, 1880:

"The president of the Master Car Builders' Association (now part of Division V—Mechanical, American Railway Association), in his address at the annual convention at Detroit on June 8, made the significant prediction that the maximum load of eight-wheel freight cars will in a short time have increased from 10 tons to at least 20 tons, while four-wheel cars will be carrying from 10 to 12 tons. The committee on freight-train brakes reported that it had had correspondence with 22 inventors, and gave encouragement that the ultimate success of the endeavors to produce brakes that will act independently on any car to which they are attached."

If you were to read the proceedings of the Master Car Builders' and Master Mechanics' Association over a period of 40 years that they were in existence, and of the Mechanical Division for the 11 years it has been in existence, you would find continual progress going on and you would find not only today but back for 50 years that they were not content with what they had but were always striving for improvements.

It is fitting to refer back to this 50 years because another thought occurs to me. A hundred years in the life of the world is a short time, but you know that 100 years ago, May 24, the first pair of wheels rolled on a railroad in common-carrier service. So, in a way, we are celebrating at this meeting the centennial of the common-carrier service of the railroads of the United States. On that day a little jerk-water stagecoach with a team of horses pulled a car on rails containing passengers, that had bought tickets from Baltimore to Ellicotts Mills, a distance of 15 miles.

We can't go back 50 years to follow the various steps, but we can go back to 1921 to see what has been accomplished, and you have had your part in that. The miles per active locomotive per month, for example, have increased 16.6 per cent in 1929 as compared with 1921. The gross ton-miles per month per active locomotive increased 50.2 per cent. The train speed increased 14.8 per cent. The gross tons per

train increased 30.0 per cent. The gross ton-miles per train-hour increased 48.3 per cent. The pounds of fuel used to create that locomotive power in freight service per thousand gross ton-miles decreased 23.4 per cent. In other words, in 1921 you were burning 184.8 lb. of coal to create 1,000 gross ton-miles and in 1929, 141.6 lb.

That is a wonderful record. I wonder just how much of the recovery of the railroads from the period of federal control and the after years which were so unfortunate has been due to what you gentlemen have been able to accomplish in increasing the efficiency and the economy with which these railroads have been operated. You are going to see some pictures about power-brake investigation, for which the railroads have spent large sums of money. I don't know what the answer is going to be, but out of it is going to come a better knowledge of the problem.

I don't know anything about the technique of your business. I would have to be introduced to a draft gear to know what it is. Anyway, I would not know about all the details, but, in connection with modern locomotives and modern trains, I know you have given attention to the matter of draft gears. You have made tests at Purdue University and prepared specifications, but nevertheless, in my judgment, equally important with this power-brake investigation is a continued detailed intelligent study of this problem of draft gears, and I believe that on the solution of those two problems will depend very largely the future economies you are going to bring about.

That is merely the opinion of a fellow who sits on the sidelines and sees the show go on. We read a lot about what is going on in the world. We have a hush-hush engine in England. I don't know anything about it, but if it is good I know you will take advantage of it. Then there is the question of Diesel locomotives. There are other questions in the offing. You think you have accomplished a lot in the last few years. I will make the prediction—I won't be here to see the outcome—but I will predict you are going to make more progress in the next ten years than you have in the past twenty. That is a large statement, but some day when I am gone, you will say, "Well, he knew what he was talking about." You are going to do it, and the results will depend largely on you men in division and associated divisions, working in connection with the Interstate Commerce Commission.

The problems of the locomotive designer may be roughly classified under two headings: first, the more efficient generation of steam; and, second, the more efficient utilization of steam. That is the problem.

You have other problems. I notice downstairs you have airplanes and motor buses and two years from now when you come down you will find a dirigible here and as time goes on you will find more and more of those things. Your job is to co-ordinate them with railroad service and to improve the railroad service to meet the situation that is created by these other forms of transportation.

You are extremely fortunate in having in your organization the Hon. Frank McManamy, chairman of the Interstate Commerce Commission, who for years has been a member of Division V and who is thoroughly familiar with the important work you are doing. You are especially fortunate when you consider how burdened he is not only with his regular duties as a commissioner but also those which automatically fall on his shoulders as a result of his election to the chairmanship.

Mr. McManamy is a tireless, conscientious worker on the commission, as are his associates, but the duties of none of these gentlemen ever rests so heavily on their shoulders as to prevent them from being ready at all times to co-operate with you in the technical and practical solutions of your problems. It is such men as these to whom I have referred who have done such effective work in promoting real co-operation and a better common understanding between railroad managements and the federal regulating body. It is true that their judgment does not always agree with ours, but you must remember that it is always possible for men to ar-

Electric Locomotives on the New York Central at Harmon, N. Y.

rive at different judgments with regard to a complex situation. But out of all these differences of judgment come, in the end, progress and advancement by reciprocal education and practical co-operation.

We take off our hats to the great pioneers of the railroads, the men who had courage, vision and nerve to push these great railroads over the mountains and the prairies and cover all this country. The day of that kind of pioneer is over. There is no more pioneering of that kind. The newer field of pioneering is to get more out of the machine. To provide efficiency and economy is your job and out of it pioneers are going to develop and their honor will be just as great as that accorded the men whose vision in the past pushed these railroads over the country.

You mechanical men are necessarily forward looking. All of our yesterdays have helped to establish and maintain civilization in the wilderness. The pilots of our locomotives have poked them mile by mile across the continent and back again. If something stopped them one time, they came back again and went through. Their whistles disturb the eagles in the mountains and the bears in the bayous and the commodities they pull behind them at ever increasing speeds feed, clothe, shelter, and amuse a population that was 12,800,000 when the pilot-poking commenced, and is over 120,000,000 now. The men behind that pilot-poking adventured in the fields open to them.

Their courage and their will conquered their difficulties and they expect no less of us. So the words of a poet transmitting the command of all pioneers are an appropriate parting:

"Only my standard on a taken hill
Can cheat the mildew and the red brown rust
And make immortal my adventurous will:
Even now the silk is tugging at the staff,
Take up the Song! Forget the Epitaph!"

Report of General Committee

Proposed type E coupler, proposed certification of draft gear and provision for periodic box packing are features of past year's work

The membership of the division at the present time includes 195 railways, representing 394 memberships in the American Railway Association, and in addition thereto, 349 railroads, associate members of the American Railway Association.

These railroads, members and associate members of the American Railway Association, have appointed 1,221 representatives in the Mechanical division. In addition there are 981 affiliated members and 225 life members in the division.

The last session of the division was held June 25-28, 1929, inclusive. Since that time, the General Committee has taken action on several important subjects. This action is outlined in the following report, and your approval is respectfully requested.

The revisions of and additions to the Manual of Standard and Recommended Practice account of recommendations of committees at the 1929 annual meeting, as approved by letter ballot, have been issued in the form of loose leaf pages to be inserted in the manual.

The drawings for the recommended practice cars comprising single-sheathed steel-frame box cars of 40 and 50 tons capacity; double-sheathed wood-sheathed steel-frame box car of 40 and 50 tons capacity; steel-frame stock car of 40 and 50 tons capacity and all-steel hopper car of 50 and 70 tons capacity have been completely revised to incorporate the latest action of the association and are now contained in the supplement to the manual.

Periodical Repacking of Journal Boxes

The provision of Interchange Rule 66 making a car owner responsible for the cost of periodic repacking of journal boxes became effective January 1, 1930. Your particular attention is called to the reference to this matter contained in the report of the Committee of Lubrication of Cars and Locomotives.

Loading Rules

The recommendations from the Committee on Loading Rules considered at the 1929 annual meeting and approved by letter ballot were incorporated in a revision of the rules issued effective January 1, 1930. This committee is receiving splendid co-operation from the shippers in developing safer and more economical methods of loading materials.

Tank-Car Specifications

The tank car specifications containing revisions approved by letter ballot in 1926 have not been reissued for the reason that the interstate commerce commission has recently issued specifications covering the tanks of such cars used for transporting dangerous commodities. It was felt advisable to wait until the Interstate Commerce Commission's specifications were issued before issuing the American Railway Association specifications, so there would be no conflict. The Committee on Tank Cars, in cooperation with the Bureau of Service, Interstate Commerce Commission, the Bureau of Explosives, the American Petroleum Institute, the Manufacturing Chemists' Association and the tank-car builders, has revised these specifications which are included in its report to the annual meeting this year. If these revised American Railway Association's specifications for tank cars are approved by letter ballot of the members they will be issued, effective January 1, 1931.

Mechanical Inspection Department

The mechanical inspection department of the division has continued, throughout the year, making investigations covering repairs to foreign cars and billing therefor. Where definite overcharges have been found as a result of these investigations, refunds have been made to the car owners, in accordance with the billing regulations of the association.

Joint Investigation of Tank-Car Appliances and Devices

Arrangements have been made to continue the cooperation of the Committee on Tank Cars with the American Petroleum Institute and the American Railway Car Institute in conducting tests and investigations of tank car appliances and devices. The equipment for these tests has been given to the association by the Union Tank Car Company and is now located at Purdue University, Lafayette, Indiana.

Couplers and Draft Gears

The Committee on Couplers and Draft Gears is submitting a very complete and important report this year containing recommendations for specifications for draft gears and for adoption as recommended practice of a modified type of coupler known as Type E. These recommendations are among the most important which will be submitted for your consideration this year and should receive your very careful and thoughtful attention.

The subject of the elimination of brake-pipe angle cocks from passenger-equipment cars has been referred to the president of the association setting forth the status of the subject and calling attention to the fact that nothing more can be done by the Mechanical Division to bring about the elimination of brake-pipe angle cocks from passenger equipment cars.

The sub-committee handling the subject of damage to tracks, bridges and track devices due to brine drippings from refrigerator cars has been cooperating throughout the year with the sub-committee from the Engineering Division.

Lateral of Front Wheels in Four-Wheel Trailer Trucks

In recent years a large number of locomotives have been designed having four-wheel trailer trucks in order to better distribute the load of the modern heavy boiler and firebox. A question has been raised by the Interstate Commerce Commission,

Bureau of Locomotive Inspection, regarding lateral play of front wheels in such four-wheel trailer trucks.

This matter has been given careful consideration by the General Committee and the following sub-committee has been appointed to make detailed study of the matter and report to this Committee: W. I. Cantley, (chairman), mechanical engineer, Lehigh-Valley; A. G. Trumbull, chief mechanical engineer, Erie; G. McCormick, general superintendent motive power and machinery, Chicago & Garber, chief mechanical officer, Missouri Pacific; E. B. Hall, general superintendent motive power and machinery, Chicago & North Western.

Vacancies on Committees

F. R. Mays, general superintendent motive power, Illinois Central, was elected a member of the General Committee to fill the vacancy made by the resignation of J. E. O'Brien, chief motive power and equipment, Seaboard Air Line. The vacancy on the General Committee caused by the resignation of W. L. Bean, mechanical manager, New York, New Haven & Hartford, was held in abeyance and nomination is now made by the Committee on Nominations. R. G. Henley, superintendent motive power, Norfolk and Western, was appointed chairman of the committee on Electric Rolling Stock account of the resignation of W. L. Bean, and A. L. Ralston, mechanical superintendent, New York, New Haven & Hartford, was made a member of this committee to fill the vacancy.

The General Committee joined with the General Committees of the Traffic, Transportation and Freight Claim divisions in the recommendation for the employment of an engineer to study the problem of handling drain tile, sewer pipe and other clay products. The engineer employed is actively engaged in this investigation under the direction of a joint committee representing the four divisions above mentioned.

Investigation of Automatic Train-Line Connectors

Upon the authority of the board of directors, H. A. Johnson, Director of Research, has been given charge of the investigation of automatic train-line connectors for air-brake, air-signal and steam-heat lines between the cars. Arrangements have been made to conduct laboratory tests of such devices at Purdue University, also road tests will be conducted of devices selected as the result of such laboratory tests.

Upon recommendation from the Committee on Lubrication of Cars and Locomotives, the word "reinforced" was eliminated from the specifications for dust guards adopted by letter ballot last year before these specifications were placed in the Manual. It was found certain patents were involved and that the use of this word in the specifications might possibly result in the creation of a monopoly of these devices.

The Interstate Commerce Commission on January 29, 1930, its Docket 21997 issued an order permitting carriers to equip for purposes of investigation and tests a number of its box or other house cars with running boards made of material other than wood with certain limitations. To date the General Committee has not been advised of any railroads which has equipped any of its cars with such experimental running boards.

The General Committee has arranged for co-operation with the American Society of Mechanical Engineers upon the following subjects: Standardization of wrought-iron and wrought-steel pipe and tubing, standardization of rolled threads for screw shells of electric sockets and lamp bases, standardization of screw threads, standardization of high-pressure malleable-iron brass-seat unions and standardization of stock sizes, shapes and lengths for hot- and cold-finish iron and steel bars.

The attention of the members is directed to the recommendations which will be found in the report of the Arbitration Committee on the subject of freight-car trucks. These recommendations have the full concurrence of the General Committee and members are urgently requested to give consideration to a program for the gradual replacement of arch-bar trucks on existing cars with cast-steel side frames complying with the specifications of the Association.

The committee recommends that no ballot be taken this year for members of the Committee on Nominations. It is recommended that the present committee be continued.

The report was signed by G. E. Smart (chairman), chief car equipment, Canadian National; A. R. Ayers, (vice-chairman), general manager, New York, Chicago & St. Louis; C. E. Chambers, superintendent motive power and equipment, Central Railroad Company of New Jersey; C. J. Bodemer, superintendent machinery, Louisville & Nashville; E. B. Hall, general superintendent motive power and machinery, Chicago & North Western; F. R. Mays, general superintendent motive power, Illinois Central; John Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe; J. S. Lentz, consulting master car builder, Lehigh Valley; J. A. Power, superintendent motive power and machinery, Southern Pacific Lines in Texas & Louisiana; O. S. Jackson, general superintendent motive power and machinery, Union Pacific System; F. H. Hardin, assistant to president, New York Central; S. Zwight, general mechanical superintendent, Northern Pacific; A. G. Trumbull, chief mechanical engineer, Erie; R. L. Kleine, assistant chief motive power, Pennsylvania; O. A. Garber, chief mechanical officer, Missouri Pacific.

Chairman Smart: A motion will now be in order to approve the report.

C. E. Chambers: (C. R. R. of N. J.) I so move, Mr. Chairman.

(*The motion was seconded and carried.*)

Committee Report on the Lubrication of Cars

Committee urges special efforts to comply with Rule 66——Tests being made on oil for all-year service

G. W. Ditmore
Chairman

This committee, which was appointed to investigate the general lubrication of railway equipment and to promulgate a rule for effective car-journal lubrication requiring fixed standards for materials and workmanship, is in a position to report that since the adoption of Rule 66 marked progress has been made on roads represented on this committee. Some of these roads have effected as much as a 50 per cent reduction in hot boxes during the last six months.

The progress made in present-day train operation, namely, the main tracking, increased lengths, speeds, and more intensive methods of yard operation, demand that cars must be in the best possible condition to complete their journey from point of origin to destination. When the cost of setting out a car enroute in a train, and the embarrassments attending such delays from a traffic-department standpoint, are considered, it should be apparent that any reasonable expense that will insure proper lubrication and care of journal boxes and contained parts is justified. The objective sought is uninterrupted train operation, and to that end lubrication is one phase of maintenance that should receive careful attention.

Your committee has found that there are still a number of roads not yet prepared to meet the provisions of A. R. A. specifications as required by Rule 66, and in this connection it is recommended that car owners should give their own cars the same attention with respect to material and practices as the foreign car receives, otherwise the intent of this rule is defeated. All roads should institute a program of periodic repacking in the same manner as now obtains in the cleaning of air brakes. Systematic reconditioning of journal boxes by car owners as required by the rule will unquestionably bring about a decided improvement in rolling stock and train operation.

Some practices that have come to the attention of the committee and that should be strongly discouraged are: Stencilling of cars by owners, indicating that they have been rejacked and repacked, but failing to perform the work as required by Rule 66; and the practice of applying new journal bearings to cut journals on cars just prior to delivery to connecting lines.

The prices set forth in the Interchange Rules for performing this work amply reimburse the handling line for the periodic attention foreign cars are required to receive. These monetary allowances do not provide for any profit, as it is not the intention that such work shall be done by favorably situated roads for the purpose of making a profit. The members are therefore strongly urged to exert a special effort to carry out the intent and purpose of Interchange Rule 66.

Oil for All-Year Service

Your committee, in conjunction with the Committee on Specifications and Tests and a committee representing the American Petroleum Institute, drew up specifications for summer car oil and winter car oil, and submitted them to the members in Letter Ballot D V 658. They were adopted as recommended practice, effective March 1, 1930. Since the report of your committee last year, exhaustive tests were conducted during the summer of 1929 using winter car oils. The results of these tests have so far proved that a low viscosity oil can be used successfully for all-year service. Further tests will be conducted this summer with oil of a grade meeting specifications for winter car oil to determine service performance. At the close of these tests the committee expects then to be able to offer its recommendation for an oil suitable for all-year service.

Renovated Oil

Your committee recommends that present specifications for renovated oil be changed to read:

"3. Viscosity.—The viscosity at 210 deg. F. shall be within the same range as the range specified between new summer car oil and new winter car oil, as adopted by A. R. A. as standard practice."

This range has been found to be necessary to provide for renovated winter car oils with viscosity at 210 deg. F. below 50 sec.

Reclaimed Waste

In order to conform with the requirements of "Standard Specifications for New Waste for Journal-Box Packing," your committee recommends that the present requirement of Rule 66 be changed to read:

"Reclaimed waste shall not contain more then 10 per cent of strands less than 3 in. in length. Dirt and foreign matter shall not exceed 7 per cent; moisture shall not exceed 7 per cent."

In order to insure a uniform reclaimed material, your committee recommends that the following method be adopted as standard practice for analysis of reclaimed waste:

"A weighed sample, approximately one pound of the renovated waste, taken prior to resaturation, must be dried for two hours at 105 deg. C., cooled quickly to room temperature and weighed immediately. Loss in weight to be calculated as moisture. All oil must then be washed from the sample with A. S. T. M. naphtha and waste dried on wrapping paper, care being taken not to shake out and lose any dirt. After being dried, the waste must be opened up and shaken on the paper until all dirt and foreign matter is shaken out. Vegetable fibre and lint should be picked from this dirt and foreign matter.

"Gasoline washings must be passed through a 200-mesh screen, lint or vegetable fibre removed, and this dirt and foreign matter dried. The dirt and foreign matter from the waste must be added to that screened from oil and the combined weight calculated as the percentage of dirt and foreign matter against the weight of original sample."

The importance of a standard method of analysis was emphasized in the committee's investigations, which disclosed that no two methods in use were alike.

Specifications for New Waste for Journal-Box Packing

In order to clarify the intent of the present specifications and make provision for the length of strands of wool waste, your committee recommends that the present specifications be corrected as follows:

"*Section 2*—Material, paragraph (b), omit word *'Cotton'* appearing in the first line.

"*Section 3*—Mixture, paragraph (a), to read:
Cotton waste, per Section 2—(b) (c) (d).
Wool waste, per Section 2—(b) (d) (e)."

Your committee suggests that the above recommendations, subject to review by the Committee on Specifications and Tests for Materials, be submitted to the members for adoption by letter ballot.

The report is signed by G. W. Ditmore (chairman), master car builder, Delaware & Hudson; H. W. Johnson, superintendent of motive power and rolling stock, Minneapolis & St. Louis; P. Maddox, superintendent car department, Chesapeake & Ohio; T. O. Sechrist, assistant superintendent of machinery, Louisville & Nashville; A. J. Harner, lubrication engineer, Union Pacific; M. J. O'Connor, mechanical inspector, New York Central; I. T. Burney, lubrication engineer, Boston & Maine; E. von Bergen, general air brake, lubrication and car-heating engineer, Illinois Central, and E. C. Cromwell, lubrication supervisor, Baltimore & Ohio.

Discussion

G. W. Ditmore (D. & H.): One question was asked me this morning as to whether it was mandatory to make the back roll by machine. Perhaps there should be something about that mentioned in the record. I would say "No" to that question. It is not necessary. We only tried to make it easier and more economical by making it by machine, but if it is made by hand it is supposed to be wound with twine. It is mandatory that it should be made at central points. That is all that is mandatory as far as the making of the back roll is concerned.

Chairman Smart: Perhaps Mr. Ditmore has raised some question in your mind by pointing out that it is not mandatory to make rolls by machine. You may make them by hand.

T. W. Demarest (Penna.): I do not want to talk about this report from its technical side, or the preparation of the waste, or the specification for the oil, but the chairman of this committee has made a very significant statement which ought to interest all of us, and that is that the railroads report a 50 per cent decrease in connection with the number of hot boxes since the more general application of Rule 66.

The question in my mind has to do more with the operating results from your improved practice and your changed specifications rather than the detail of the specifications. I think perhaps all of us would like to hear from the chairman of the committee in regard to what a 50 per cent decrease in the number of hot boxes means—that is, whether it means one hot box every 50,000 freight car miles, or every 100,000 miles, or something else. In other words, give the association the benefit of some mark to shoot at so that each one of the roads may try and improve their practice and performance up to some ideal point.

I also think it would be most interesting if some of these gentlemen here who are in touch with their own situations would advise the Association the number of hot boxes per hundred thousand freight car miles they are getting. There is no use of minimizing the importance of this question in the operation of freight trains today. Practically every freight train is an arrangement service train on a time schedule, and may run up to 125 cars. The setting out of only one car means an interference with its schedule and a tremendous lot of transportation expense.

If any of you can give us any information in relation to the proper performance and as to what you are getting on your roads in regard to this matter, I am sure I would appreciate it.

Mr. Ditmore: On the Delaware & Hudson, in 1926, we were making around 33,000 to 40,000 miles per hot box. We started to reclaim our waste by a better method, and it began to show in the miles made per set-out, and also in train detention en route.

In 1928 we got somewhere near 100,000 miles per hot box. In 1929 we got 104,000 miles per hot box. So far this year, since January 1, we have averaged 145,000 miles per hot box.

If we put that on a comparable basis with former years when train detentions were not included, we would have a better showing, but in the last couple of years the superintendents have been reporting all detentions due to hot journals that had to be treated en route.

We feel we have made great progress. I believe other members of the committee are in a position to state practically the same results.

W. E. Dunham (C. & N. W.): Speaking for one of the railways mentioned in the report as not having

fully adopted the recommendation of the committee, I want to stress first: What is a hot box? For years our definition of a hot box has been one which causes any delay or requires more attention on the part of train crews than they can give with ordinary spooning. It is rather a tight definition, and it means counting everything that happens in a journal box.

Five or six years ago we were having what we thought was fairly good results, but we were not satisfied. We commenced to improve our method of reclaiming our packing, separating our packing, and cleaning the old oil, with the result that commencing in 1926 and continuing up to the present time our record of hot boxes has been about one per 100,000 miles average year after year. Our delay to trains is averaging less than twenty-five minutes per hundred thousand car miles.

We believe that we are not justified in going to the extent of the elaborate centralized reclaiming plants. We have reclaiming plants all over our lines that are turning out a first class reclaimed packing and reclaimed oil. It does not quite meet the specifications shown here by the Committee, but it very nearly does. We have not felt, to be very candid in the matter, that we are justified in changing our entire practice.

It would be a very expensive proposition for us to attempt to get a 50 per cent betterment over what we are already doing, but we do find this in our analysis of hot boxes, and I want to offer this as a suggestion to the committee to see if they can't help us in overcoming waste grab. About half of our hot boxes at the present time are due entirely to waste grab, and that waste grab is due to something in the oils that we are getting now—new oil as well as reclaimed—which picks up the waste. We are very positive of that statement because the same situation applies on our passenger trains as it does on our freight trains, and on our passenger trains for the larger share of the year we are using nothing but new oil and new waste in making our journal packings.

There is something in the oils that we are getting now, or something missing in the oils that we are getting now that causes this waste grab, and if that one feature can be overcome in our oils at the present time we will have a 50 per cent further reduction right in sight.

C. T. Ripley (A. T. & S. F.): Mr. Dunham I think is absolutely right when he says that waste grabs are the major causes of hot boxes. Personally I think they run to 90 per cent, from my own observation.

The committee has made a good start towards it when they pointed out the viscosity ranges, and when they put the maximum at 130 and the minimum at 210, they force the manufacturers to clean up the oil better in order to get a flat viscosity curve. But I think they are going to have to go still further.

In order to find out something about this subject we built a large icebox in our laboratory where we can run the temperature to 60 deg. below zero. In that we have the wheels mounted, have openings made in the journal boxes, have mirrors, and so forth, so we can photograph just what is going on.

I am going to make a statement that may surprise you, and that is that there are oils on the market today that will show you waste grabs in the machine at 30 deg. above zero. Why is that? The oil people have never answered it entirely. On that particular oil, I might say, meets A. R. A. specifications for a summer grade oil.

The real answer, as I see it, is that they must clean up that oil better; they must refine it better, get out the tarry matter, get out the wax, possibly acid treated, possibly centrufuge it.

We recently had one oil from one company, and incidentally this was coming from a mid-continent crude, which is usually harder to work with to make free from this sticky characteristic, but that oil consistently is running to 60 deg. below zero without any signs of waste grab. If that can be done in a sample, we may be able to get something in the specifications whereby all the oils will act the same way, and when you do you are certainly going to help hot boxes more than by any other action you can take, as I see it.

Mr. Ditmore: Answering Mr. Dunham's question: In our report of 1928, in order to have a standard method of reporting hot boxes, the hot box definition is given as a box heated above normal temperature so as to require the setting out of a car, or require treatment that will cause the car to be taken to the terminal.

Mr. Dunham: I would like to ask, if I may, how many railroads are using that definition in making their reports on hot boxes?

Mr. Demarest: In our own practice we are not, Mr. Dunham, but we define a hot box in three ways. In the first place, anything which causes a train detention on the road between terminals; in the second place, anything which causes the car to lose its train at the terminal; and in the third place, any car which has to be shopped out.

J. J. Tatum (B. & O.): Anything worthwhile to be accomplished must have a beginning. This paper has had its beginning. We are getting the experience of the work of this committee. We have had it told to use, as Mr. Demarest said, that we have increased our mileage 50 per cent on some railroads. Perhaps that is true. But there has been a change brought about in the last few years that has helped to bring about that increased mileage providing the yardstick has been applied in a way so that everybody is measuring the same thing in the same manner.

Mr. Ripley spoke of waste grabs. Waste grab, I agree with him, is a big factor in making hot boxes. I would like to see his suggestion followed up in a way that would establish a means by which to eliminate waste grab. I hope the committee will work diligently this year on that subject.

Mr. Ditmore: Speaking about counting hot boxes, I know that we are not being led astray on our railroad in counting. I can recall the time when 20 or 25 hot boxes a day was a normal figure. Today we have one, two, and possibly four, but I do not believe we have exceeded four in some time, and that is not a very difficult problem to solve insofar as our railroad is concerned.

Chairman Smart: In regard to wool content, on our two Canadian roads, it is much greater than the specification calls for. We have very little cotton. We have got to have something in there that is resilient in the winter time.

In regard to the daily treatment of boxes in the yards, you can't treat a box after it has been standing in the yard in the winter months in Canada. You have got to get busy when that train arrives in the yards, and push the packing back and get it under the journal. After the car arrives at the terminal, or the yards, that is the time and the place to do the treating.

Another thing that will help you out considerably in operating in cold weather on the high speed trains is to give a little shot of oil to the journal before a car starts out. Do that just before the train leaves, when it comes to the terminal station where you have an oiler

and just before it leaves the coach yard for the terminal. Those are the two most important things to do because you get the majority of hot boxes in the winter months.

It is important not only to have a good grade of waste and a good grade of oil, but to know how to treat them after your waste is put into the journal boxes.

C. J. Bodemer (L. & N.): I was impressed by the statement made by Mr. Dunham of the North Western. He stated that reclaiming oil to meet the A. R. A. specifications involved rather expensive equipment or facilities. He also stated, I believe, that they were having about one hot box every hundred thousand miles on the North Western, which I believe is a very good record, and in doing that with reclaimed oil does not quite meet the specification. Furthermore, he indicated that the reclaiming plants or his method of reclaiming waste did not involve the expensive, intricate methods that might be necessary to bring about the specifications laid down by the committee for reclaiming oil.

I think it would be interesting to this body to learn something about the reclammation methods on the North Western.

O. S. Jackson (U. P.): We get our morning reports and in many cases the most distressing report is that of the hot boxes we have had in the preceding 24 hours. I think Rule 66 was a splendid move. The next thing, however, is for us to police the work and see that our men are doing the work according to the rules provided. I have made some personal investigation of that and I have found several cases where only an attempt was made to comply with Rule 66. I think that we should give this committee not only our support, but full co-operation. They have a big job before them. We are running our trains at greater speed all the time. The detention of trains is more detrimental to our service each year because of the fact that the service is getting more exacting each year.

Mr. Ditmore: I would like to answer the question of Mr. Dunham, as to the expense of putting up a modern plant. We had three or four reclamation plants prior to building a centralized plant. Now, in regard to the cost, you can make that as elaborate as you want to. It all depends on the kind of building you want to build and kind of machinery you want to purchase. However, it is not much of a problem to reclaim oil and waste to meet the specification, it is a very simple matter.

Mr. Dunham: I have been asked to give some idea of our method of reclaiming. First, I want to indicate we have 9,000 miles of road to cover which is scattered rather thinly over the Northwest territory in three particular directions. Concentrating in any particular territory for the reclamation of packing would mean an expensive handling to and from the point of use and reclamation. That is the particular instance where we ran up against cost. Not so much the cost of actually reclaiming in your plant, but the handling of the old material in and the new material out.

Our system is an improvement over the old general plan of throwing dirty oil and waste together with new material and mixing it up. We do rattle the old waste. We first press out the oil and then rattle the old waste and get that old waste in a fairly clean condition. The old oil we run through a comparatively crude cleanser. We mix our packing with the cleaner oil. In some of our plants we have a continuous cleaning process in the bath. In others of our smaller plants we clean the oil only occasionally, that is, every other day or so forth, according to the size of the plant. We do get a packing that is much better than what we used to use, we have got to admit that, and I think I indicated that in my first statement that we improved our old crude method of reclaiming our packing. We haven't felt that we are in position to go to extreme refinements of some of the modern methods of making packing, but we have taken our older type of packing repair plants and just improved the details here and there with the result that we have kept up our operating performance with the increased speed of trains which, I think you will all agree, has been developed in the last two years at least.

Our records for hot boxes are slightly lower at the present time than they were just prior to the time we put on these high-ball trains and for the past year it is the exception on our line to see a dead freight train. Everything is fast freight, nothing moves slowly. Dead freight trains are a thing of the past.

Mr. Tatum: It appears someone has taken a wrong impression from some of the remarks I have made regarding the suggestion to get the lubrication cost of mileage and that I had in mind to discourage the refinement in reclaiming oil and waste. That was the least I had in mind. I don't think that any committee could have done a better job than this Lubrication Committee has done in laying down methods by which to reclaim waste and oil. If one should investigate carefully the method we have been using, and some of us are now still using, to reclaim oil and waste and make comparison between the quality of waste and oil we have reclaimed under the crude methods with that set up by the committee, they would be surprised to find how poor a job we were doing. We are just completing a plant on our railroad at Cumberland, that we think will do as the committee requires us to do in the reclaiming of oil and waste, and I am sure it will help us to get better results than we have been getting. The idea of suggesting the cost was to help those who have not spent the money and whose management has not agreed to spend money to get this reclaimed oil and waste.

M. A. Kinney (C. & O.): It isn't my purpose to go any further on the discussion that we have had here of lubrication. I do want to state, though, that I consider and I believe all of us do that this committee is one of the most important committees that come to this convention. The hot box situation is a problem that we have got to face.

The Chesapeake & Ohio, is hauling heavy commodity stuff and a large percentage of our business is coal. Don't think that coal doesn't have to move at high speed. It is moving at high speed and it is necessary that we have improvements of this kind. There is another feature I believe we should stress, and that is that this committee should set up a standard of performance. It is always very important to compare ourselves with some other road.

Mr. Chambers: The report said quite a bit about the quality of oil causing the waste grab. I think they ought to give serious consideration to whether the quality of the waste has anything to do with it, possibly a little too much lint in the wool waste.

L. J. McLean (D. & H.): During the past 10 days I have checked up approximately 2,600 boxes. Of these we developed 55 that had loose, missing or improperly fitted box covers which showed evidence that they would cause trouble to the car journal. In a great many cases the wrong cover is being applied to the journal box. The springs on some of the boxes are missing, allowing the lid to flop up and down with the movement of the train.

I also found that in several of the types of journal boxes they were bent so that when a properly applied lid was placed on the box that you still had openings

that would allow a certain amount of water and grit to accummulate. That total was about 2.1 per cent of the total number of boxes examined. Of the number of boxes examined, the waste in the tight-fitting box was found in good condition.

O. A. Garber (Mo. Pac.): The railroad with which I am connected has about 12,500 mi. and we have installed reclaiming plants. When we first started out with these plants we put in two and we didn't get the advantage from them that we thought we should. So we put in a filtering plant and our hot boxes began to lessen. Before we started with these reclaiming plants we were having two hot boxes to 100 car miles. On our last report we are only having one-half hot box, and on the northern lines we are having .69 hot boxes to 100 car miles.

I favor the central reclaiming plant. There are a lot of things that enter into the causing or lessening of hot boxes than we had a few years ago. Conditions have changed. Our tracks are better, oil better, waste better; in fact, everything is better, cars are moving faster, which I think is an advantage.

Some years ago when I was master mechanic we had some manifest trains that left an original terminal which were made up from all different industries and it was almost impossible to get all those trains over the road without one, two or three hot boxes, but we don't find that condition today. We pick up these cars, service them and they run. I attribute that to the fast moving of the cars.

S. Zwight (Nor. Pac.): Each one that made statements here gave the definite mileage they are getting per hot box. I wonder whether that was the average for the year around or for certain months of the year.

We go along very nicely during the summer months up to the cold weather period, and then things go all to pieces. It can't be in the maintenance or packing of the journal bearings and the journals that bring that about. It is the weather conditions and the lubrication, the oil, it must be, because of the congealing effect and the waste grabs. The waste grabs, it has been stated, are probably the cause of 90 per cent of our hot boxes. Mr. Chambers touched on the cost of waste. We find that the cost of waste has considerable to do with it. We examine the waste when we have a lot of hot boxes and we find a little "wiper" as we call it. When we get the waste new we pick the fuzz out of it. That helps. I would say it was a contributing cause.

Mr. Smart spoke of free oil. I assume he referred to passenger cars. I think when we have hot-box troubles it is during bad weather conditions, cold, stormy, when we haven't men enough in our yards to get around, but we do that on passengers; we give them a little free oil. There wasn't anything said about the kind of free oil. I think the railroads use everything from kerosene or gas engine oil to the ordinary car oil. Your ordinary car oil would have the benefit in starting off unless it was so cold it would congeal. What we have used the last couple of years is a light viscosity oil known as the 100 viscosity. We introduce that alongside our journal on passenger cars before they start out at certain points on the line. That has reduced our difficulties, but we haven't done much with our freight cars. The only thing I can see to do is go to a lighter viscosity oil.

I think that part of our troubles in years past has been using summer and winter oil. Cars that are packed in the summer time with summer oil go into the winter and you have difficulty then with the heavy oil congealing. We have gone to an all year around oil. I think that will aid us materially in reducing our hot boxes.

Mention was made here of the oil box lids. We had difficulty on certain cars this last winter. We found that the hot boxes were a development from snow getting in the boxes, and melting, floating the oil off. Then, if the car stood still any length of time, it would freeze and bring about waste grabs. Oil companies have been endeavoring to give us oil to give best results, but in compliance with Rule 66 I think the periodical packing of boxes has probably had more to do with it than any one thing.

Some years ago, we started in with a central plant for reclaiming, but we found that didn't work out satisfactorily on account of the time required to get that packing in and out of the central reclamation plant. Our hot box difficulties come largely during bad weather. Then the capacity of the reclamation plant isn't sufficient.

We tried metal containers to ship packing in, but, in spite of all we could do, we would get oil spots on the floor of our box cars, making them unfit for high-class loading. We have established waste reclaiming plants at several points on the line so they can reclaim the waste there under close supervision, seeing to it that they drain the sludge out; that the waste is tumbled and in good condition before it is used and that the oil is mixed with a certain amount of new oil. We don't use any of the reclaimed oil straight. We have got to use new oil anyway, so we mix it, depending on the season of the year.

G. S. Goodwin (C. R. I. & P.): A story was told about a calf that made the original crooked path and how long it persisted down through the years. I think some of our practices on the railroad are little crooked paths. The thing I am thinking of particularly is the fetish about the cost of lubrication.

We hear about maintaining lubrication at a certain cost, even to purchase at a guaranteed cost. I think we lose sight of our goal in keeping to those costs. We try to hold our cost of lubrication down on engines. What is the result? We cut out packing in cylinders and when we renew the packing and rebore the cylinders we spend more than we would have if we had spent enough for oil in the first place.

I think that is true to a lesser extent on cars, and that is something we ought to analyze—what it costs to lubricate. We ought to see the results we get and be sure we are making a good investment, not worry about what we spend for lubrication.

W. H. Flynn (N. Y. C.): As far as the work of the committee is concerned I don't feel that our recommendations, which have heretofore had the approval of the convention, are too severe.

We take foreign cars, and we are in position now where we take a good many more than we have in the past, which have got to be run at the same speed that the old cars are, and they are all the same, all in the pot. It seems to me that inasmuch as there have been improved recommendations which have been the result of careful and thoughtful study on the part of the committee we all ought to try to follow them as close as we possibly can.

Mr. Chambers and Mr. Zwight touched on the amount of lint in the waste. We have had experience with that. It bothered us considerably, but we hope that with the adoption of the improved recommendations for reclaiming waste and getting rid of a lot of short strands in this line which the reclamation should do, we will get better results. There is one point I would like to mention here concerning the treatment that should be accorded journal boxes and packing at terminals where cars lay over at night with temperatures of 15 to 20 deg. below zero. We

have had a peculiar situation to contend with and some of our friends have had the same thing. We would have temperatures at high as 40 and 45 deg. in New York City. We would start a train out and everything would run all right westbound until it arrived at Chicago, where the temperature would be 12 to 15 deg. below zero. Then our troubles began.

The treatment we finally developed for passenger car journal boxes differs a little from that followed by the Canadian National. We didn't molest the boxes in the morning. If we had any free oiling to do, we did it when the boxes were warm and we put it alongside the journal where it would do the most good. That seemed to solve our troubles. It helped us materially last year. What it will do next year, I don't know, but when you start at the originating terminal with a high temperature and cars lay over at a terminal where there are low temperatures, you have trouble. I would suggest that the committee give that consideration, as I believe it would be of interest to many of us who have such conditions to contend with.

Chairman Smart: We use free oil on passenger cars of a very low cold test, and we have found the best practice to follow is to put that free oil in just before passenger trains start out, either from the terminal or terminal station if you have the oilers there. If you put free oil in the boxes when the cars arrive, the boxes are warm, the oil runs away from the journal down to the bottom of the box. When you start passenger cars you have to develop a certain amount of heat before lubrication starts, so it has been our thought to apply a little free oil of very low cold test on the face of the journal before starting.

Mr. Zwight: I would like to ask if that would be from the coach yard.

Chairman Smart: Just before you start out, depending on the location of the terminal. In some cases coach yards are a mile or two from your terminal station. We don't place an oiler at the terminal as our coach yard is close to the terminal and the work is done in the coach yard.

Some questioning has been brought up here about the cost. It is simple to get it. Just ask the purchasing department to give you the total cost and weight of oil for one year. Divide it among the total cars and locomotives, and if you want an argument to put up to your vice-president or your senior mechanical officer, just show him that statement showing how many million pounds of waste, how many hundred thousand gallons of oil are purchased a year. Don't try to keep a record of how much you issue out at the shops. Put it up to the man who buys it or get it from the man who manages your store. I found it was the simplest method. With a railroad like the Canadian Pacific, with 21,000 miles of track, you have got to change it all the time. You have to figure out just the quantity of waste, the extent of your terminals, the number of cars passing through. We do it in our car department for all our cars.

J. W. Gibboney (N. & W.): I thought it might be of interest to the members to explain a little about our experience on the Norfolk & Western with an all-year-around oil. On the Norfolk & Western last year, about the middle of July, we started using a winter grade of car oil and we haven't stopped yet. I think that the trend will be possibly toward a lower viscosity than our present winter oil with a lower cold test.

I believe that the work the committee is doing along that line will be valuable and I thought it might give some of you some real assurance if you have this statement that a fairly heavy traffic road operating at fairly high speeds is using an all-year-around car oil with good success. Our hot boxes per hundred thousand miles are lower now than last year, being about 145,000 miles per set-out.

G. C. Christy (I. C.): I would like to ask if the roads that haven't adopted the committee's recommendations are billing on Rule 66 when they repack foreign cars.

Mr. Dunham: We are billing, but we are using new oil and new waste when we bill. I would like, if possible, to overcome an impression that the North Western is not in favor of the committee's recommendation. We certainly are. We are heartily in favor of it, but when you analyze these factors down to the cost basis, and that includes not only the purchase cost of oil and waste, but the handling cost as well as the servicing cost, as I said in the first place, we don't feel we are justified in changing our present practice where we very nearly reach the requirements in our reclaimed packing, as laid down by the committee.

We analyze all our oil as reclaimed. It is sent in regularly for checking by our chemists to see where we stand. The work isn't done carelessly. One of the speakers mentioned the fact that our present-day situation in packing isn't all due to the oil and waste. That is true. It is due to the care we are giving the oil and waste. It is due to the care we are giving the boxes, and it is due to the care of our inspectors in the field watching for things before they get serious.

R. A. Pyne (C. P.): I don't know what part of Canada our friend Smart lives in. I live in the northwestern part, but I don't live in the district where they have 60 degrees below zero. We do have bad weather conditions. They say misery likes company, and I was very much at home when our friend from the Northern Pacific was telling his troubles.

We have conditions peculiarly local. Our business is confined to handling agricultural products. We have to work within certain limitations in getting those products to tidewater or the waterfront within a limited time. That brings into action a large number of cars or a large amount of equipment that is ordinarily stored and we have no use for it during the summer months. It is almost a physical impossibility to get over all these cars, because in handling cars our interchange wouldn't come into contact with that because these cars are isolated and they stay in our territory. We have a problem because, when the cars are loaded, they are loaded to the limit. They are all carrying grain, and the grain loaders, elevators and the farmers, put in all they can.

We have been struggling for a number of years with waste grabs. I agree with one of the speakers who lays part of his troubles to the oil companies. It has been our experience for a long time and the discussion here today has confirmed it. We have gone into a very elaborate system of reclamation. We can give you costs. I haven't got them at my fingers' ends, but we have had some very satisfactory results. We purify the oil. We first made our experiments in purifying the oil with a cream separator. We were much surprised at the results. We have now 10 plants reclaiming waste and purifying oil. In addition to the analysis made from time to time by our company chemists, we work in cooperation with the University in Manitoba and in Alberta, who co-operate with us in checking with our chemists. We find in the purification of oil we come within .05 per cent in the matter of precipitation as far

as the A. R. A. specifications are concerned, after our reclamation has been completed.

Our waste troubles are principally grabs in the winter. On some of our single-track lines there is, necessarily, in getting freight trains over the road, some delay or detention, sometimes an hour or longer. With the weather conditions we have in that country, some difficulty is experienced in a 30-minute delay in a temperature of 30 deg. below zero. Sometimes it is necessary to separate the train and take it out and run it up and down—warming it up, as we call it. In doing that we get rolling conditions where the waste will roll and come out on the ground. I don't know whether you have that experience in the south, but we have it in the west. We have also succeeded in the last two years in adopting a winter oil. We try to operate in the west with a summer and winter oil. You can understand with the amount of equipment we have packed with summer oil coming into service in the winter when the temperatures were low, we have had some experiences. We have had some experience with working with an all-year oil in the west. I want to pay tribute to this committee because I think most of the assistance we have had in solving our hot box trouble is from the information we have received from it. We have followed religiously, at least in the west, the application and intent of Rule 66.

S. Lynn (P. & L. E.): I have come here this morning to get some information because hot boxes are a sore spot with me. I am in the same position Mr. Kinney is in—what tonnage we have these days is heavy tonnage. When we start a train out of a terminal we will only get anywhere from 12 to 20 miles when we stop.

We have adopted a centralized dope and oil reclamation plant, and had it in operation, and I am sorry to say we haven't improved our situation a whole lot. We did make some improvement, but we can't get 100 per cent. I am speaking entirely on the freight-car situation.

I would like to know if there are any roads here in the position I am in that have adopted the new method of reclaiming oil and waste and have not been able to make the improvement.

We average from six to seven set-outs a day up to 15, and they are not all P. & L. E. cars. I got some information this morning I never received before in discussing this problem with our foreman. They always present the waste grab. I believe a high percentage of our failures are due to waste grab, but I understand here this morning that our oil has something to do with it. We probably can improve that, but I have taken the position with our own organization that they are taking it for granted that the set-outs we have are waste grabs. I know that the waste will roll and on a railroad such as ours which is practically a switching operation from one end to the other we are going to have a condition where we will probably have more waste disturbed in the boxes than on the roads where they have a long haul. One of the things I got into recently, was where we had a number of cars stored. Those cars were taken by the transportation department and moved to the mines. Nothing was said about it. We didn't have an opportunity to inspect the journals or boxes. When they got a load on them they ran hot. We had other conditions where empty trains coming to us had as high as three to five set-outs of empty cars on account of hot boxes. In going into the matter I found that those cars had been held in storage for some time.

There is a possibility that those journals had pitted or rusted between the waste line and the brass and, often without a load, they ran hot. So it requires careful inspection and attention, not only with the loaded but with the empty cars if you are going to get away from hot boxes.

R. L. Kleine (Penna.): Mr. Lynn has inquired whether any other roads had a similar experience with heavily loaded cars causing more hot boxes than the lighter loaded cars. I might say we have the identical experience. Mr. Demarest touched on our practices on the Pennsylvania. I might say we are running approximately 180,000 miles per hot-box detention on freight cars. Our experience along the line of hot boxes is with heavily loaded ore cars in our Cleveland district. We tried entirely new oil and new waste, notwithstanding that we had the approved reclamation process in effect on the Pennsylvania. We have three plants and handle our waste in metal containers and have specially assigned freight cars in order to prevent leakage of oil on the floor. In this Cleveland district, after we tried the new waste and new oil, we did not correct our hot boxes and the trouble was entirely waste grabs. Our cars run hot within five miles after leaving the terminal. We started with waste grabs. We took a hook and hooked each empty car before we load the cars, and we found the waste grabs on those empty cars. We packed them up and took out the waste grab, and we practically eliminated our hot boxes on those heavily loaded cars, although we still have some.

We follow the same practice on cars at the initial terminal point. We hook all of our journals in order to eliminate waste grab.

I want to add that the reclamation plants we put into service paid for themselves in the amount of oil we reclaimed, as well as waste. It greatly reduced our cost of these materials, and we got the savings right out of that. We are now after our hot-box situation until we eliminate the waste grabs, and I think experiments along the lines Mr. Ripley has made, as well as looking further into the question of these waste grabs will give us a solution.

K. F. Nystrom (C. M. St. P. & P.): At the last meeting in Los Angeles some discussion took place in regard to the reinforcement of cars. I understand that is being corrected, but I don't see it in this paper. Is that right?

Secretary Hawthorne: It is covered in the General Committee Report and is covered in the Manual Issue of March 1, 1930.

Mr. Nystrom: If it is in order, I would like to make a motion that the Lubrication Committee frame up proper instruction to be adopted as the recommended practice for reporting hot boxes. When the lubricating committee started this work, I felt they went entirely too the extreme. I have changed my mind and I believe that Mr. Ditmore's committee has done the most important work next to the Coupler Committee in the last 20 years.

A. G. Trumbull (C. & O.): Several significant statements have been made during the discussion this morning, and I would just like to take a moment to give them added emphasis.

It appears that the hot-box troubles are largely due to lubrication, that is, the oil and waste and possibly also to improperly fitting journal-box lids. Just exactly how much of existing troubles may be due to any one of those causes may be doubtful. We have impressions, but we don't have facts.

It seems to me that, in view of the fact that lubrica-

tion is a more important factor in operation than ever before by reason of the length of trains, the speed at which they are operated and the ever increasing demand for efficiency in railroad operation, we ought to go further into these problems in railroad lubrication than appears now to be the purpose.

It isn't so long ago that lubricants for equipment were furnished by not more than one oil company, and that came from one oil field where there are now several lubricants furnished by innumerable companies from different fields. The oils from those fields have different bases, and I think most of you know, and it seems to be reasonable, that oils with different bases will produce different results. I think that was brought out in Mr. Ripley's comments this morning which I think was one of the most important things said.

As far as the lubrication of automobile engines or internal combustion engines is concerned, there has been a great deal of research by the oil companies to see what oil would be best. Why? Because it is known that improper lubrication will produce improper results in automobiles and, of course, improper lubrication and improper results will affect the sale of automobiles. But what oil company has made an investigation of a scientific nature to see what lubricants will produce the best results under railroad operating conditions? It is fair to assume likewise that the railroads are unable to do what they are doing on the Santa Fe. It would be an economic waste if they did, but that such an investigation should be made I think is very obvious.

We should also know what the influence of waste is on the lubrication. As you know, some railroads are using cotton waste—I am speaking particularly of freight lubrication—some cotton waste in which springs are interposed and some wool waste, but who knows what will give the best result with lubrication? The D. & H. has made an interesting observation on the percentage of journal boxes which had defective lids and, if I remember the figures correctly, it was something like 55 out of 2,600. I would not have been surprised, and I think most men here would not have been surprised, if the statement had been made that there were only 55 properly fitting lids, and not 55 improperly fitting ones, out of 2,600. When I say that, please understand that I know very well that the D. & H. is a comparatively short line and is a large interchange railroad, and that the figures they gave didn't apply to their own equipment by any means. Everyone in this room who is familiar with the existing situation in regard to journal-box lids and journal boxes, especially with the steel side frames we are using now, knows very well we have improperly fitting lids. We set up in our proposed standard practice an elaborate system of finding out how much dirt there was in the packing. That is quite proper, but it would be infinitely better if we finished the box and put the lid on so as to keep the dirt out, rather than to devise means for finding out how much dirt there is in it.

Chairman Smart: There is a motion before us—that this committee prepare a standard method of reporting hot boxes and that this report be accepted and a vote of thanks given to the committee and the recommendation be referred to letter ballot.

(*The motion was seconded and carried.*)

Chairman Smart: I am going to set aside the report of the Nominating Committee. There is a reason. The General Committee must meet Mr. Aishton at one o'clock at the Dennis Hotel.

(The meeting then adjourned.)

Mechanical Division Losses by Death

THE General Committee of the Mechanical Division paid formal honor to the memory of fourteen former members of the Mechanical Division, of whose deaths the secretary has been informed during the past year, in its report presented during the opening session on Wednesday. The following are the names so mentioned:

Name	*Title and Railroad*	*Died*
Anderson A. W.	Vice-President and general manager, Charleston & Western Carolina	Feb. 3, 1930
Bell, J. Snowden.	City Hall station, New York	Nov. 1928
Bell, R. W.	General Superintendent of motive power, Illinois Central (retired)	Oct. 14, 1929
Dick, M. M.	District master car builder, Chicago, Milwaukee, St. Paul & Pacific	Dec. 25, 1929
Eberle, W. F.	General foreman, Pennsylvania (retired)	Feb. 1, 1930
Farris, W. E.	Vice-president and general manager, New Orleans Great Northern	Jan. 4, 1930
Harvey, H. L.	Superintendent of Motive Power and machinery, Chicago & North Western	Feb. 19, 1929
Hawkins, R. D.	General superintendent of motive power, Atlantic Coast Line	Aug. 7, 1929
Kneass, Strickland L.	Vice-president, Wm. Sellers & Co, Inc.	Nov. 24, 1928.
MacRae, J. A.	Life member (retired)	June, 1924
Riley, G. N.	Superintendent of machinery, Lake Terminal	Jan. 14, 1930
Shafer, G. S.	President, Norfolk & Portsmouth Belt Line	Jan. 29, 1930
Watson, S.	Assistant district superintendent of motive power, New York Central	
Wyman, R. L.	Master mechanic, Lehigh & New England	

Reading Joins in Through Coach Service

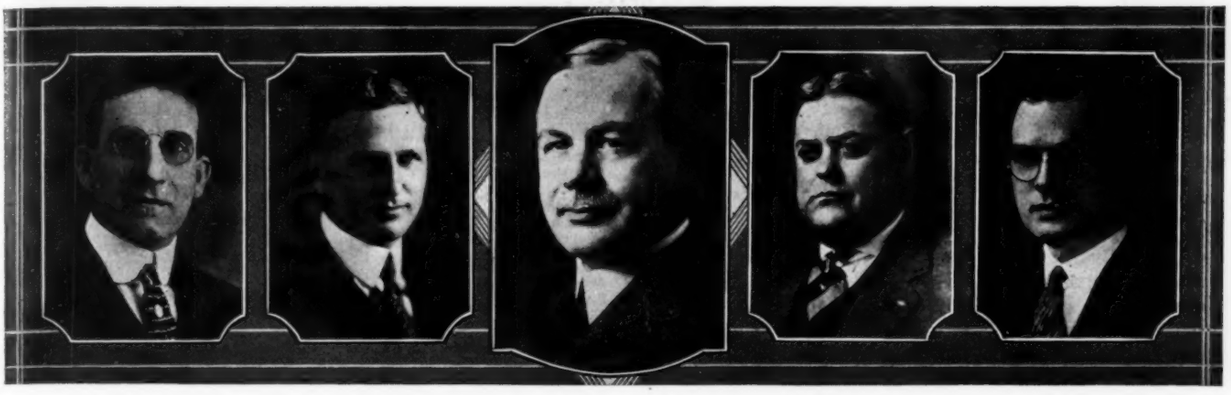
THE Reading has entered the trans-continental motor coach field covering forty-two states and eastern Canada, according to an announcement made last night by E. D. Osterhout, passenger traffic manager. The Reading Transportation Company, motor coach subsidiary of the railway system, yesterday concluded negotiations with the Colonial-Atlantic-Pacific stage system and connecting lines for motor coach operation and interchange of passenger traffic to and from all points on the Reading now served by highway motor coaches, and connecting with one of the largest motor coach networks in the country. The nation-wide service will be placed in operation today.

As a result of this agreement, the Reading Terminal will become one of the largest motor coach terminals and transfer points in the eastern part of the country.

Plans have been perfected for the immediate transformation of a portion of the first floor of the terminal into a modern motor coach depot.

Throughout the day motor coaches will leave Reading Terminal for seashore points, New York, Reading, Pottsville, while other schedules will be maintained direct to Washington, D. C., Pittsburgh, Chicago and mid-western cities, connecting with routes to points as far as Miami, Florida and New Orleans, La., as well as to California lines via the Santa Fe Trail and the Grand Canyon.

The agreement had been extended to include the Jersey Central Transportation Company.



R. K. Stackhouse P. J. Neff A. P. Russell E. Wanamaker G. M. Campbell

Motor Transport Division Convenes

Recognition of task facing organization is keynote of first Atlantic City session——Aishton congratulates members

RECOGNITION of the progress made by the Motor Transport Division since its inception at Atlantic City four years ago was voiced by R. H. Aishton, president of the American Railway Association, in an address at the opening session of the division. At the same time, Mr. Aishton pointed out the magnitude of the task which still confronts the division in studying means of co-ordinating railway and highway service and in influencing the enactment of sound legislation to regulate highway carriers.

A. P. Russell, executive vice-president of the New York, New Haven & Hartford, and chairman of the Motor Transport Division, presided at the morning session which was held in committee room 12. The attendance, 55 officers representing 61 railways, was steadily augmented during the day as those who arrived late were registered.

Presenting the report of the General Committee, Mr. Russell announced the resignation of R. L. Fairbairn (Canadian National) from the chairmanship of the Rail Motor Car Section, and of T. B. Wilson (Southern Pacific) from the General Committee. He also announced the appointment of E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific, as chairman of the Rail Motor Car Section in place of Mr. Fairbairn, and the appointment of C. R. Harding, assistant to the president, Southern Pacific, as a member of the General Committee to succeed Mr. Wilson. A resolution of regret at the retirement of Mr. Wilson was unanimously adopted.

Upon recommendation of the General Committee the division voted to hold its next meeting in Chicago on November 18-20.

Report on Legislation

R. N. Van Doren (Chicago & North Western), chairman of the law committee, presented a thorough report of the events which have transpired at Washington during the consideration by Congress of the Parker Bill, H. R. 10288, to regulate interstate motor coach lines. He described the amendments to the bill which were inserted in the House and by the Senate committee on Interstate Commerce, which have earned the vigorous opposition of the railways and other advocates of the Parker bill in its original form. It is expected that the bill will come before the Senate for debate before the close of this week, but there is said to be little likelihood of its passage in its present form.

At the close of the morning session, Mr. Russell announced his desire to retire as chairman of the division. He was prevailed upon to withdraw his resignation, however, it being the unanimous conviction of the membership that the division urgently needs the leadership of Mr. Russell for the full term of his office.

Aishton Addresses Division

At the afternoon session Mr. Aishton addressed the members of the division briefly. In addition to speaking highly of the work the division is doing, he emphasized the urgent necessity for regulation of the highway lines. "The public and motor interests will demand it, and regulation is bound to come," he said.

We are now in a new era of transportation, and the railroads look to the Motor Transport Division to play its part in this new era, he continued. The division has already made more rapid progress than any other division in the brief time of its existence, and the Interstate Commerce Commission and Congress are depending upon it for information regarding the problems that the railroads face as a result of the development of highway transportation.

M. J. Gormley, vice-chairman of the American Railway Association, spoke briefly following Mr. Aishton.

Rail Motor Car Section Reports

Opening the program of the Rail Motor Car Section, Mr. Wanamaker took the chair and read a paper on "The Probable Rail-Motor Equipment of the Future,"

which was discussed at some considerable length.

W. F. Collins, automotive engineer of the New York Central Lines, presented a report on "Organization for Maintenance and Supervision of Rail Motor Cars," and a report on "The Future Needs in Rail Motor Car Development" was presented by F. Hartenstein, assistant to the general manager of the Lehigh Valley.

A paper entitled "New Methods in Train Heating" was read by S. M. Sovocool, engineer, Peter Smith Heater Company. A. H. Candee, railway engineer, Westinghouse Electric & Manufacturing Company, read a paper on "Torque Control for Internal Combustion Engines," which aroused considerable discussion.

The afternoon meeting was an open session, and was attended by 34 representatives of the supply trade.

The second day's session will open at 9:30 this morning, and will be featured by the reports of the committees of the Motor Coach Section, P. J. Neff, chairman of the section, presiding.

Registration American Railway Association

Division V—Mechanical

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Arcelon, H. I., A. E. of T., B. & O., Haddon Hall
Armstrong, Geo. W., Engr. Bethlehem Stl. Co., Member A. R. A., Ambassador
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Bennett, R. G., G. S. M. P., Penna., Haddon Hall
Bentley, W. F., Spl. Inspctr., B. & O., Pennhurst
Best, H. E., M. C. B., N. Y. D. Line, Colton Manor
Bever, O. S., Jr., Consit. S. E., C. N., Ambassador
Bibb, Arthur, Ch. Car Drafts, D. & H., Brighton
Billington, Malcolm D, Supvr. Loco., Pere, M. C., Ritz
Bilty, C. H., M. E., C., M., St. P. & P., Brighton
Biorkholm, J. F., A. S. M. P., C., M., St. P. & P., Ambassador
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Booth, C. W., N. M., N. Y., N. H. & H., Seaside
Booth, W. L., C. of Y. & T. Opr., C. & O., Ritz-Carlton
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Boyden, J. A., M. E., Marlborough
Bray, C., G. C. I., Penna., Princess
Brazier, F. W., A. G. S. M. P., N. Y. C., Marlborough
Brennan, E. I., S. M. P., C. G. W., Shelburne
Brigham, E. D., Jr., V. P., N. A. Car Corp., Ambassador
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Brossart, I. A., Supt. R. S., C. C. C. & St. L., Ritz-Carlton
Brown, B. S., Asst. Engr., Penna., Seaside
Brown, Edward L., G. C. F., B. & O., Traymore
Brown, F. S., M. E., Erie, Princess
Brown, Geo., G. M. M., D. & H., Strand
Brown, Harry E., A. F. W. S., Reading, Breakers
Browning, A. C., Asst. to Sec., A. R. A., Ambassador
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Calder, W. W., D. M. C. B., B. & O., Princess
Carl Dierks, C. I. C. D., D. & H., Marlborough
Carr, F. W., M. E., P. & L. E., Knickerbocker
Carson, G. E., D. M. C. B., N. Y. C., Dennis
Cartwright, Kenneth, A. M. E., N. Y., N. H. & H., Traymore
Case, Truman G., G. C. F., N. Y. C., Pennhurst
Chandler, R. L., Dist. M. C. B., N. Y. C., Traymore
Chapman, E. E., Engr. Tests, A., T. & S. F.
Cheadle, T. S., Ch. C. I., R. F. & P.
Chesney, Samuel, Mach. W. J. & S.
Chew, Howard W., G. C. F., B. & O., Chalfonte
Christy, L. R., M. C. B., M. P., Shelburne
Clark, D. S., Asst. Engr., A. R. A., Ambassador
Clark, Edw., M. M., Cornwall, Marlborough
Clark, J. H., Supt. Float Equip., B. & O., Shelburne
Clark J. N., Ch. Fuel Supv., S. P., Ambassador
Clark, J. P., Ret. Suprv. Sig., Reading
Clark, John, S. C. D., C. R. R. of N. J., Dennis
Cleapey, C. H., A. R. A. I., A. B. & C., Lexington
Clements,, M. W., V. P., Penna.
Coddington, H. W., E. of T., N. & W., Ritz
Coffman, B. J., A. M. E., R. F. & P., Runnymede
Collins, James J., G. F. S. & Rec., Erie, Traymore
Collison, W. A., S. M. P., Monon, Ritz.
Connal, W. F., M. E., C. N., Ambassador
Cooper, H. M., Insp., Penna., Penn Atlantic.
Cooper, W. E., Supvr. Tank C. D., Bureau of Explo., Glaslyn Chatham
Corfield, W. D., G. F. A., Reading, Ambassador
Cotton, C. A., Supv. M. E., C. & N. W., Ambassador
Coulter,A. F., M. C. B., Union, Morton.
Coulter, J. W., M. M., A. & S., Traymore
Courtney, H., S. S., P. & L. E., Knickerbocker
Covert, M. F., S. C. E., Q. C. T. L., Ambassador
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Crook, C. R., Sec. C. N. Club, C. N., Ambassador
Cross, C. W., Supvr. Appr., N. Y. C., Haddon Hall
Crowell, F. C., G. C. I., Penna., Princess
Culbertson, H. J., M. M., C. M. & St. P. & P., Ritz
Cunningham, W. P., S. M. P., Monongahela, Colton Manor
Dailey, E. B., Engr. C. Con., S. P., Traymore
Darden, C. M., Supt. Mach., N. G. & St. L., Dennis
Davenport, J. D., Asst. M. M., C. & O., Ritz
Demarest, T. W., G. S. M. P., Penna., Brighton
Denney, C. E., Pres., Erie, Traymore
Dichinson, F. W., M. C. B., B. & L. E., Chalfonte
Dickert, C. L., S. M. P., C. of G., Ambassador
Ditmore, G. W., M. C. B., D. & H., Marlborough
Doherty, E. H., M. M., Nickel Plate, Traymore
Dowdy, E. R., M. M., C. & O., Ritz
Doyle, L. R., G. M. I., F. G. Exp., K. of C.
Drobnis, George J., Off. Rprtr., A. R. A., Ambassador
Dwyer, E. J., Sec'y to Pres., A. R. A., Dennis
Dyer, R. H., G. C. I., N. & W., Ritz
Eddy, James H., D. C. F., C. R. R. of N. J., Penn Atlantic
Eley, E., M. C. B., C. P., Dennis
Emley, N. B., Supt. F. T. & M., Erie, Dennis
Epright, A. W., Supr. S. & W., Penn., Princess
Esterly, Amos R., Foreman, R. D. Y. S.
Ettenger, R. L., Asst. to V. P., S., Shelburne
Fager, A. H., G. S. M. P. & C. E., C. N., Dennis
Fegley, Henry M., Acct. M. P. Dept., Reading
Filskor, T., Ch. E. & Supt., Ravitan River, Strand
Finley, Frank F., C. R. Clrk., N. W., Colton Manor
Firth, R. Smedley, Mt. Eng. Tank Car Dept., Sun Oil Co., Dennis
Fishe, C. D., Mach. Penna.
Fisk, L. M., M. C. B., N. Y. C., Ritz-Carlton
Flynn, Walter H., G. S. M. P. & R. S., N. Y. C., Marlborough
Foster, Hal D., S. Cost Engr., C. B. & Q., Ambassador
Fowler, W. H., G. F. C. R., S. P., Strand
Francis, Victor A., Elect., Reading, Melbourne
Freedman, Erwing A., Equip. I., N. Y. C.
Fuller, C. E., Past Pre., M. M., Marlborough
Gary, T. E., M. M., S., Tremont
Gebris, Wilson E., Coach Insp., Reading, New Terminal
Gibboney, James H., Chf. Chemist, N. & W., Ritz
Gilliford, C. M., Draftsman, Penna., Iroquois
Goho, L. G., F. C. D., P., Madison
Golden, H. H., S. I., L. & W., Shelburne
Gomez, H. M., Trav. Sec. to Ex-V. P., N. Y., N. H. & H., R. R. Traymore
Goodwin, E. L., A. M. S., Pullman Co., Ambassador
Goodwin, Geo. S., A. G. S. M. P., C. R. I. & P., Chalfonte
Gorman, E. R., S. M. P. & M., C. St. P., M. & O., Ambassador
Gormley, J., A. T. M., P.
Gower, J. A., Supvr. A. I., Penna., Colton Manor
Gray, B. H., S. M. P., G. M. & N., Ambassador
Grewe, H. F., Supt. M. P., A. C. & Y., Haddon Hall
Grimshaw, L. E., Works Manager, Penna., Chalfonte
Grow, J. T., M. C. B., N. Y. C., Traymore
Gullace, Joseph G. F. C. D., B. & M., Shelburne
Hahl, Harry M., President, T. C. C. of A., Brighton
Hallett, W. K., G. M., Bangor & Aroostook, Marlborough
Hammett, Philip M., S. M. P., M. C., Traymore
Harris, A. A., Mech. Supt., N. Y., N. H. & H., Haddon Hall
Harrison, W. R., M. M. A. T. & S. F., Traymore
Harter, Chas., C. M. E., M. P., Haddon Hall
Hartshorn, Carl L., A. M. E., N. Y. N. H. & H., Stevenson
Hass, H. P., A. to G. M. S., N. of N. H. & H., Traymore
Hassett, E. H.,Mech.
Hawthorn, H., S. E., C. of C. A.
Hawthorne, V. R., Secy. Mech. Div., V., A. R. A., Ambassador
Hayden, J. R., S. C. D., M. K. T., Ambassador
Helgran, T. R., Supr. Mach., C. B. & Q., Ambassador
Hemingway, T. A., D. C. F., D. H., New Richmond
Henley, R. G., S. M. P., N. & W., Ritz
Hennessey, J. J., Asst. Supt., C. D. C. M. S. & P. & P., Ambassador
Henry, J. M., A. C. M. P., Penna R. R., Chalfonte
Herter, F. J., A. Engr. Car Const., C. & O., Ambassador
Hess, Geo. F., S. M. P. W., Ambassador
Highleyman, J. W., Supt. M. P. & M. O. S. L., Ambassador
Hillyer, Geo., Jr., M. E., S., Marlborough
Hollinger, C. A., F. Bagg Dept., P. R. R., Sterling
Homan, Frederick L., L. L. Drafts., N. Y. C.
Hoppe, A. G., Eng. of T., C. M. St. P. & P., Ambassador
Hornig, K. F., Mech., P.
Horrigan, J., S. M. F., Traymore
Howard, John W., D. C. F., D. & H., Wellsborough
Howard, R. J., Supt. C. D., Pacific Fruit Express Co., Marlborough
Howell, F. P., Supt. Motive Power, S. M. P., A. C. L., Shelburne
Hudson, B. H., Supt.,Penna.
Hughes, Isaac, Mach., Penna.
Hughes, J. W., Elect. Eng., C. P., Dennis
Hunt, R. B., Mechanical Engineer, F. E. C., Sterling
Hunter, H. S., Ret. M. M. R., Eastbourne
Ingalls, G. H. Jr., Rep. Con. Car Traf., N. Y. C., Marlborough
Irving, T. P., Engr. of Car Con., C. & O., Dennis
Irwin, J. E., M. M. & P. A., S. S. Ry., Princess
Jackson, Fred, M. M., L. & H. R., Arlington
Jangro, Jos. P., S. P. C., Mt., B. & M, Shelburne

Jellis, W. F., L. I., I. C. C. Shelburne
Jenkins, Charles, Off. Rptr., A. R. A., Ambassador
Jenkins, F. J., G. L. I. T. & P., Marlborough
Jenkins, P. H., Rd. For. of E., A. C. L., St. Charles
Jewell, C. F., Insptr. Trans., W., Traymore
Johnson, J. O., S. C. D., S., Sterling
Johnston, W. D., Dist. M. M., B. & O.
Jones, H. N., G. S. M. P., Penna., Marlborough
Jumper, F. J., Spl. E. Chg. I., U. P., Ambassador
Justus, D. J., Special Insptr., N. Y. C., Morton
Kagarise, Preston, G. C. I., P., Princess
Keegan, J. E., Ch. C. I., Penna., Marlborough
Kelly, S. R., M. M., S., Ambassador
Kennedy, G. N., A. G. F., P. R. R., Kentucky
Keppleman, H. S., G. C. I., Reading, Ambassador
Kessler, A. L., Ch. of Clear-Sec., Penna., Princess
Kiessling, E. W., Gen. For., W. J. & S.
Kilken, John E., Engr. of Shops, Mo. Pac., Shelburne
Kilker, John, E. of S., M. P., Shelburne
King, Homer C., L. I. I. C. C., Llewellyn
Kinney, M. A., Gen. M. M., C. & O., Traymore
Kinter, D. H., G. F. C. D., Monongahela, Shelburne
Kirby, T. M., M. E., M. K. T. lines, Ambassador
Kirkland, A. W., S. M. P., A. B. & C., Ambassador
Klein e, R. L., A. C. M. P. C., Penna., Dennis
Knight, G. W., Elec. Insp., B. & O., Knickerbocker
Knight, Wm. G., M. S., Bangor & Aroostook, Ambassador
Krait, E. A., Supt. Tank Car Maint., Pure Oil Co., K. of C.
Krech, C. S., V. P., Penna.
Krueger, A. J., M. C. B., N. & St. L., Ambassador
Kuhn, W. T., S. M. P., T. H. & B., Traymore
Kuhns, L. A., Master Mechanic, Craig Hall
Kurfess, L. S., Asst. S. C. D., Erie, Ritz
Lang, W. C., M. C. B., P. & L. E., Jefferson
Laughlin, Geo. F., G. S. S., Amer. Car. Line, Marlborough
Linder, W. C., Ch. C. I., P., Shelburne
Link, A., D. M. M., M. C., Traymore
Lockard, J. H., Supr. M. P., P., Chalfonte
Lorsdon, Wm. J., Asst. Erec. For., B. & O., Continental
Lollis, E. W., Gen. Supt., C. M. St. P. & P., Traymore
Loose, E. B., For., Reading
Lovejoy, Geo. R., M. M., Det. Term., Carolina Crest
Lynn, Samuel, S. R. S., P. & L. E., Brighton
Machovec, E. E., Mech. Supt., A. G. & S. F., Haddon Hall
Maischaider, A. F., Asst. to G. M., C. C. C. & St. L., Ambassador
Mallory, Chas E., Supt., Kingan Ref. Line, Ambassador
Manning, Ray R., Off. Rptr., A. R. A., Ambassador
Manor, E. R., Sp. Engr., N. P., Ritz-Carlton
Marlow, G. A., Ch. C. I., Penn., Marlborough
Martin, Kenneth H., G. E. I., S., Shelburne
Martin, Livingston, Ch. A. R. A. Bureau, B. & O.
Massey, Geo. H., Asst. M. M., C. R. R. of N. J., Dennis
Matthes, John, Trav. C. I., W., Ambassador
Mays, F. W., Gen. S. M. P. I. C., Shelbourne
McBride, Wm., Elect. F., So.
McCloskey, W. J., G. C. F., I. C., Princess
McCowan, A., A. G. S. C. D., C. N., Ritz-Carlton
McCoy, G. E., G. C. F. E., C. N., Traymore
McCune, W. C., Insptr., I. C. C., Shelburne
McDowell, J. L., G. C. F., Ky., Ind. Term., Osborne
McEwen, R. M., G. C. F., I. C., Princess
McIntosh, J. M., M. M., N. Y., N. H. & H., Haddon Hall
McLain, Leland J., T. C. I., D. H., New Richmond
McMullen, John M., S. C. D., Erie, Ambassador
Meadows, C C., M. C. B., Tydol Co., Chalfonte
Mehan, J. E., Asst. to Supt. C. D., C. M. S. & P. & P., Ambassador

Division VI—Purchases and Stores

Amory, A. J., Asst. P. A., C. N., Dennis
Argyle, C. S., Dist. S. K., C. N., Chalfonte
Baile, M. E., Asst. Sup. Agt., M. P., Breakers
Batson, L. O., C. C. to P. A., Pacific Fruit Express
Bietry, J. N., Trav. S. K., St. L. S. W., Traymore
Blanchard, F., Jr., Stat. S. K., B. & O., Ambassador
Blum, J. P., C. C. (C. B. & Q.), Ambassador
Boice, C. D., P. A., F. E. C., Haddon Hall
Bossert, W. S., Req. Marker, Penna.
Bowers, W. C., V. P., N. Y. C., Traymore
Britt, T. E., D. S. K., B. & O., Haddon Hall
Brown, N. J., S. K., B. & S., Princess
Browne, O. L., A. to P. A., A. C. L., Bretton Hall
Bruckert, R. H., S. K., K. & I. T., Knickerbocker
Burt, C. L., S. Tie & Treat., Shelburne
Bush, H. O., G. L. & T. I., Erie, Haddon Hall
Carlson, Edward A., D. S. K., P. M., Keystone
Clem, Wesley A, Asst. P. A., Reading, St. Clair
Clifford, E. A., G. P. A., C. & N. W., Traymore
Cocke, Clyde, P. A., N. W., Ambassador
Coleman, C. T., G. S. K., A. B. & C., Ritz-Carlton
Corbett, J. W., P. A., C. N., Ritz-Carlton
Cossette, A. J., D. S. K., C. & N. W., Traymore
Cottrill, G. K., T. S. K., N. Y. C. & St. L. R. R., Ambassador
Coulter, A. S., Req. Marker, P. R. R.
Crawford, R. D., P. S. K., M. P., Haddon Hall
Creedon, F. D., C. C. to P. A., B. R. P., Haddon Hall
Dale, A. R., G. S. K., F. E. C., Kentucky
Daniels, O. V., S. K., Penna., Traymore
Davis, W. W., P. A., P. & S. Fe, Ambassador
Dawson, V. N., Asst. G. S. K., B. & O., Haddon Hall
Day, Paul H., Req. Cl., Bangor & Aroostook, Princess
Deery, James, A. P. A., P. R. R., Traymore
de vilbiss, E. B., A. S. M., Penna., Chalfonte
de Vilbiss, E. B., A. S. M., Penna., Chalfonte
Dewart, H. M, P. A., C. V., Madison
Dickerhoof, R. A., G. Mtl. Supvr., Penna., Jefferson
Dickinson, T. R., C. C. to P. A., B. & L. E., Marlborough
Diehl, Walter J., P. A., M. & O., Traymore
Dippery, Geo. A., F., Reading
Doherty, R. A., S. K., L. L. & W., Dennis
Donagan, O. A., G. S. K., B. & M., Chalfonte
Driscoll, F. E., P. A., Erie, Traymore
Duvall, L. F., A. G. S. K., A. C. L., Ambassador
Dyson, C. H., F. A., B. & O., Ambassador
Eaton, J., Asst. G. P. A., C. P., Colton Manor
Elett, V. E., T. S. K., N. & W., Ambassador
Elmore, D. R., Asst. to Genl. Mgr., Haddon Hall
Endy, W. N., Asst. to G. S. K., Reading, Madison
Evans, D. E., A. G. S. K., L. V., Jefferson
Farmer, J. D., S. K., N. & W., Ambassador
Farraday, C. L., Supvr. Pur., Penna.
Field, L. E., Supt. Mtl. Std., B. & M., Chalfonte Haddon Hall
Fisher, O. D., Genl. Mtl. Supvr., Penna., Runnymede
Foley, F. J., Gen. S. K., N. Y., N. H. & H, Traymore
Foley, John, Asst., P. A., Penna., Traymore
Follette, A. G., Asst. Ch. Matl. Supr., Penna., Bretton Hall
Fraser, D. V., A. P. A., M. K. & T., Traymore
Galloway, W. S., P. A., B. & O., Shelburne
Garnham, L. S., Supvr. P. A. Office, Penna.
Geary, J. H., Supt. of Stores, Erie, Strand
Genther, J. S., Gen. S. K., L. & N. E., Haddon Hall
Gerber, J. W., Gen. S. K., So., Marlborough
Gilbert, A. V. B., P. A., A. B. & C., Ritz-Carlton
Glenn, J. C., S. K., C. R. R. of N. J., Commodore
Glosh, W. C., C. C., N. Y. C. & St. L., Ambassador
Goodwin, P. E. W. Jr., S. K., F. G. Ex. Co., Princess
Gordon, W. B., G. S. K., N., Seaside
Grammer, P. L., Asst. Pur. Agt., Penna., Traymore
Griffith, B. W., G. S. K., N. Y. C., Shelburne
Griswold, W. W., Stationer, C. R. I. & P., Strand
Hagerty, E. D., Ch. Matl. Supt., Penna., Haddon Hall
Hall, C. B., Strs. Mgr., Penna., Chalfonte
Hall, F. E., C. C., C. R. R. of N. J., Marlborough
Hamahan, J. V., S. K., N. Y. C., Marlborough
Hammond, F. S., P. A., P. S. & N., Haddon Hall
Hanna, J. L., Genl. Matl. Supvr., Penna., Traymore
Harris, R. C., G. S. K., Penna., Haddon Hall
Harris, Sndnor, S. K., R. F. & R., Haddon Hall
Hawes, F. G., Ch. Bur. Control, C. & O., Ambassador
Hayden, S. A., C. C. to G. S. K., M. K. T., Ritz
Herrold, E. E., Stationer, B. & O., Strand
Hewey, R., Mat. Cl., B. & M., Ambassador
Hopkins, Wm. A., G. P. A., M. P., Marlborough
Hughes, E. H., G. S. K., K. C. Sou., Shelburne
Hunter, Geo. J., Tray. Mat. Supvr., A. T. & S. F., Ritz
Irish, J. L., G. S. K., O. W. R. R. & N., Haddon Hall
James, J. H., P. A., P. & L. E.
Jones, W. F., P. A., N. Y., Chalfonte
Keillor, S. E., D. S. K., C. N., Chalfonte
Kelly, C. H., Supr. S., L. V., Princess
Kenzel, C. H., P. A., E. J. & E., Chelsea
King, D. C., P. A., Marlborough
King, L. L., Asst. P. A., I. C., Traymore
King, W. E., S. K., A. C., Princess
Kinnear, F. H., P. A., C. N., Madison
Knauer, W. R., Supvr. St. Cat., Penna., Chelsea
Knobb, Samuel E., Asst. C. C. Str. D., Reading
Krampf, L. A., Supply Agt., M. P., Chalfonte
Krell, F. C., Forester, Penna.
Kuhn, W. N., Asst. F. P. A., Penna.
Kukis, J. J., Supt. of Strs., Erie, Traymore
Lacy, H. S., P. A., Carolina Crest
Lance, I. H., G. S. K., D. L. & W., Dennis
Laughton, Hunter H., Asst. to V. P., S., Marlborough
Lavoie, Louis, G. P. A., C. N., Shelburne
Layton, J. L., Asst. Ch. Matl. Supvvr., Penna.
Leary, G. W., Supr. Shop Trans., C. & O., Ambassador
Le Blancy, H. P., Stores Insp., C. N., Chelsea
Linson, Chas. N., Asst. C. C., Reading
Litchfield, H. E., S. K., B. & O., President
Livingston, Jno. B., Dist. S. K., C. N., Seaside
Lloyd, H. C., Dist. S. K., Pacific Fruit Express Co.
Lloyd, R. F., C. C., L. L. & W., Dennis

Motor Transport

Allison, R. H., Asst. to G. M., C. C. C. & St. L., Ritz
Ballon, Morris P., Asst. to P., Ry. Ex. Agency, Traymore
Barber, C. A., G. P. A., Lehigh Valley
Becker, Howard W. T. F. A., Reading Co., Philada.
Bernstein, E. R., V. P. & G. M., L. & N. W., Traymore
Bradshaw, G. A., Insptr. of Trans., L. N. R. R., Marlborough
Burns, L. B., Asst. to G. S., S. A., Ritz
Campbell, Geo. M., Sec., M. T. D. A. R. A., Traymore
Collins, W. F., A. E., N. Y. C., Haddon Hall
Cunningham, E. A., Effic. Eng., C. P., Haddon Hall
De Faughn, J. P., G. P. A., B. R. & P., Chalfonte
Elder, A. H., Genl. Sol., C. R. R. of N. J., Shelburne
Ferguson, A. D., B. of E., C. N. Eastbourne
Gallagher, Thos. M., D. F. A.,
Gearwar, Dwight V., M. S., N. Y. N. H. & H., Shelburne
Gurney, T. H., P. T. M., C. & O., Ritz-Carlton
Hardin, C. R., Asst. to Pres., S. P., Ambassador
Hartenstien, F., Asst. to G. M., L. V., Knickerbocker
Hayes, J. L., A. G. F. A., B. & O, Shelburne
Huntington, H. E., A. Traf. Mgr., B. R. & P., Chalfonte
Irwin, I. D., A. S. T. T. & O., Ritz-Carlton
Jerome, F. C., G. F. A., N. Y. C., New Belmont
Kessler E. B., Spl. Agt., Penna.
Lerch, Geo. P., M. S., Reading, Ambassador
Lowes, W. E., A. to P. T. M., B. & O., Haddon Hall
Maxwell, H. Z., Asst. Gen. Sol., Penna., Haddon Hall
McNeille, J. K., S. M. T., D. & H., Marlborough
Neff, P. J., V. P. & S. M., M. P., Ambassador
Parrish, C W., Supvr. P. S., N. & W., Ritz
Repass, Everett L., C. C., N. & W., Ambassador
Rodwell, K. W., Asst. Supt. Trans., S. A. L., Haddon Hall
Russell, A. P., Ex. V. P., N. Y., N. H. & H., Traymore
Russell, D. W., Asst. to Pres., St. L. S. W., Ritz
Sherman, J. K., Asst. Engr., Penna., Haddon Hall
Smith, E. M., Special Representative, Erie, Traymore
Stackhouse, R. K., S. S. & T., Penna., Haddon Hall
Steinberger, M. F., Mgr. Hw. T., B. & O., Shelburne
Van Doren, Ray N., V. P. & G. C., C. & N. W., Haddon Hall
Wadsworth, G. D., A. G. M., Q. C., Chalfonte

Members of the General Committee of the Purchases and Stores Division, American Railway Association

1454D78

The Purchases and Stores Division

C. E. Denney and R. H. Aishton address first day's session at Atlantic City——Comment on Business Outlook

THE eleventh annual meeting of the Purchases and Stores Division, A. R. A., was opened in the Auditorium at Atlantic City, N. J., Wednesday at 9:30 a.m., with W. Davidson, general storekeeper of the Illinois Central, presiding. The attendance of approximately 400, including guests, was below the attendance at last year's meeting, but taxed the accommodations provided.

The convention was addressed by C. E. Denney, president of the Erie; R. H. Aishton, president of the American Railway Association, and by the chairman, following which the day was given over to the presentation and discussion of various committee reports.

Address of Chairman W. Davidson

The time and effort that it was necessary for me to put forth during the past year in carrying on the work as your chairman has been a pleasure and inspiration. The work assigned to your chairman and to the committees has been performed to the best of our ability. Nothing has been left unfinished for the incoming officers to act upon that should have been handled during the past year, every problem having been disposed of in the most business-like manner and closed.

Large Savings Made

The recommended practices of Division VI have been put into effect have been a sound investment to the railroads and have been instrumental in saving millions of dollars invested in materials and supplies and in addition have brought about still further savings in the economical handling of materials. These practices have constantly improved the service of the purchasing and supply departments to the departments using the materials.

It is very noticeable that our purchasing departments have made tremendous savings in the purchase of materials and at the same time have procured for the using departments materials of a much higher quality and in less time than was heretofore possible. When our supply departments can depend upon prompt deliveries, the investment can be held down to a minimum and this indirectly assists the using departments in keeping their working schedules.

W. Davidson, Chairman, Purchases & Stores Division

The first meeting of the division was held in this city 11 years ago. It is almost impossible to look forward and anticipate what progress will be ours as we move on. However, we can look back upon those 11 years and feel that our work has been of the greatest benefit to the railroads we represent.

Inventories Reduced

It may not be amiss to call attention to the enormous investment in materials and supplies on Class I railroads and the reduction made in this investment since Division VI has been affiliated with the American Railway Association. In 1929, Class I railroads were able to show a reduction in materials and supplies of approximately $285,000,000 as compared with 1920.

This vast reduction is brought to your atttention in order to point out the responsibility placed upon Division VI. The problem of controlling the investment in materials and supplies account is one of its principal functions and we are of the opinion that a very substantial portion of this reduction of stock on hand is directly due to the recommended practices of Division VI and the co-operation we have received from the using departments. These practices include the simplified and improved methods of handling material which have resulted in large savings to the railroads in money expended for labor for handling materials.

Wider Adoption of Recommendations

The purchasing and stores departments are urged to consider carefully the adoption of practices recommended by this Division. These recommendations are fully covered by our proceedings and are available to everyone interested. In addition to this, the Division

VI officers stand ready and willing at all times to assist in outlining these practices to those interested. Practically every phase of purchasing and storekeeping is covered by committees from year to year and studied from every angle. The practices of Division VI, moreover, are not confined to the railroads of America but have branched out to the railroads of foreign countries such as India, Africa, Russia, Japan, Australia and others, judging from inquiries which are received from time to time for forms outlining our practices, etc.

The purchasing and stores departments have advanced in the last 11 years from a secondary position to one of major importance. The careful and effective methods of handling purchases and materials and the savings in investment of materials and supplies have brought these departments to their present major rank.

Hard Work Ahead

The business depression that we are now experiencing is a matter of particular concern to the railroads and everyone engaged in purchasing and storekeeping work should appreciate the necessity of assisting the management of their respective railroads to the fullest extent.

The work of this Association has just started. The Division faces many changes and it is our immediate task to meet these changes. This will require the coordinated planning and organizing of our every faculty and our skillful direction to see that the most important practices are presented and put into effect to assist in efficient and economical operation.

The 23 committee reports to be submitted at the convention have been thoroughly prepared by committees consisting of 197 members from all sections of the United States and Canada. The committee reports of a standard nature indicate further developments and have been revised to meet the ever-changing conditions of progressive railroading. In addition, there are three new committee reports, the reports on Purchasing and Storekeeping for Motor Bus Operation, Capacity Loading and Prompt Handling of Company Material Cars and the report on the Promotion of Conservation Methods in Use of Materials.

The necessity for the first of these reports was brought about by the operation of busses by some railroads. At the last convention, President Aishton brought up the problem of capacity loading and prompt handling of company material cars. One of the new reports is the result of his suggestion. The third report, dealing with conservation in the use of materials, it is felt, will assist all departments of the railroads in reducing operating expenses.

I wish to mention the rapid strides made in the use of mechanical devices for handling materials in storehouses, yards and shop transport systems; also in the use of supply trains in delivering materials to maintenance of way departments more efficiently. There are still further advancements to be made in these fields, which will be studied as they develop.

It is hoped that all representatives have gone over the committee reports and have made notes. Meetings of this kind are for the purpose of bringing about a better understanding of these problems and suggestions are invited.

See the Exhibits

All members are strongly urged to be prompt at the opening of each day's meeting and, if possible, to remain until closing. It is the intention to open and close each day's meeting on time. The members, moreover, should not overlook the opportunity afforded them to visit the railway exhibits in the Exhibition Hall. Purchasing and stores officers will be benefited by viewing these exhibits of improved railway machines, materials, etc.

In closing, I wish to say that the day of the jack-of-all-trades has come and gone. We live now in the age of specialists in almost every known profession. Present-day business activities, embracing mergers and mass production, inevitably call for the ability of the specialist to keep pace with research and progress, and I feel that in this thought rests the future of the Division.

The Address of C. E. Denney

Importance of railway purchases recognized and value of association work stressed by Erie president

C. E. Denney

It is a pleasure to speak at the eleventh annual meeting of the Purchases and Stores Division of the American Railway Association.

Everyone makes resolutions and breaks some of them. I resolved a long time ago not to accept any invitation to make a speech, and this is one of the few times that this resolution has been broken in recent years. My predecessor, J. J. Bernet, never made a speech of more than five minutes and resigned the presidency of the Erie to become president of three railroads.

Never were the railroads of this country striving with more persistency and perseverance than they are now to furnish the public with the kind of railway service it desires; namely, the fastest, safest and most dependable service that can be attained. It is generally recognized that the railroads are the backbone of transportation in this country and undoubtedly will remain so for years to come despite the development of new forms of transportation, such as by air, over the highways, and by inland waterways.

The railroads, as a result of the large capital program which they initiated in 1923 and which they have consistently followed since that time, have been able to bring about the greatest operating efficiency and economy ever obtained. The carriers, however, are not content with the high character of service they are furnishing the public and the high record of efficiency they have already attained, but are striving to forge their way ahead and bring about still further improvements.

Railway Purchases

The railroads are a big factor in maintaining the prosperity of the country. Expenditures made by them for supplies of all kinds enter into almost every industry. The rail carriers in 1929, for instance, spent $1,329,535,-

000 for fuel, materials and supplies alone. This amount, however, does not include purchases made indirectly by the railroads of many commodities, large quantities of which go into railway equipment and new construction that is contracted for under lump-sum agreements and is not classified under the head of direct purchases.

While railway purchases in 1929 exceeded by $58,194,000 or nearly five per cent those made in 1928, they fell below the totals for earlier years from 1923 to 1927. This reduction was in part due to greater efficiency and economy in the use of materials by the rail carriers, a gradual decline in railway inventories of materials and supplies on hand, and lower price levels of certain of the commodities purchased.

Not only has the speeding up of the movement of freight been of distinct advantage to the shippers of this country, but the railroads themselves have also benefited for it has enabled them to operate successfully with reduced inventories.

Railway Inventions

The absence of large inventories in industries and railroads will, in my opinion, be of great benefit in shortening the period of depressed business. An increase in production will make necessary the immediate replenishing of stocks. After periods of depression in the past, it was possible to resume operations with relatively small purchases to complete stocks, the amount on hand being a considerable percentage of the total required.

Consignees deserve a great deal of credit for the ability of the railroads to move cars promptly and to handle the business of the country as at present. The receiver of freight today unloads cars promptly because the material is usually required immediately. The released car is available for another load. The shortage of transportation during the war was primarily due to cars being held under load and the railroads with a carloading, during normal business, of nearly 100 cars a minute throughout the 24 hours would be seriously congested in a short time if the receivers of freight ceased to unload promptly.

Business Conditions

We have lived through at least eight months of business depression. There was a slackening of business long before we fully realize it in the fall of last year.

Every month of subnormal business brings us nearer to the time of normal business. I will no longer attempt to forecast when the up-turn of the business of the country and railroad traffic will take place but every real citizen of this country is a believer in its future and plans accordingly.

The Appliance Exhibit

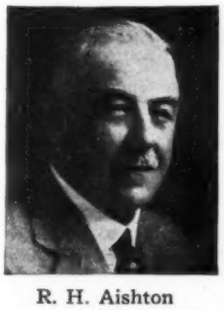
Manufacturers of railroad equipment and supplies, in spite of the decreased business, have brought their exhibits to Atlantic City at a great expense. These manufacturers are given an opportunity to show their products to railroad men from all over the country with a minimum amount of travel; likewise railroad men are given an opportunity to view the exhibits conveniently and with a minimum expenditure of time. The railroad representatives in attendance at the convention this week and next should give the exhibitors and the exhibits the attention they deserve and be benefited.

The work of committees and associations, such as the divisions and sections of the American Railway Association, is of great value to the individual who seriously takes part in such activities as well as to the railroad he represents. Those who participate in such work are materially benefited by exchanging views with men in similar departments on other railroads and are better qualified than they possibly could be without taking part in association work. The individual may be well grounded in his work and have many original ideas but the best results can be obtained only by combining with these the views gained by association with others in the same line of business.

I am impressed with the completeness of the program of your meeting and hope that it may prove to be the most successful annual meeting in the history of your Division.

The Address of R. H. Aishton

President of the A. R. A., not worried about business depression but sees problems ahead in address to Supply Officers



R. H. Aishton

I think this is the eleventh time that it has been my great pleasure to meet with the Purchases and Stores Division.

You have many problems before you. The railroads have many problems.

Mr. Denney talked about the business depression. As with all business depressions, we finally get the upward stride again. We are just a little bit be ter after each setback than where we left off. I have been through a dozen business depressions when every man was talking pessimistically as though the country were all going to ruin and we never would come out of it, but we always did come out and we are coming out of this depression. In my mind we will come out quickly.

What of the Future?

But there is a greater problem for the railroads than the problem created by this business depression. While the present traffic of the railways is a matter of concern, the great question of the railways is: What will traffic be when business becomes normal again? Over a long period of years, the trend of railway traffic was constantly up. In the last few years, railroad traffic has grown at a relatively lower rate than the volume of industrial production or population has grown.

That means that some of this business must be seeking other means of transpor'ation, and leaves three great problems before the railroads that must be solved (and are being solved, I will say) first, the problem of utilizing for their own purposes the newer forms and methods of transportation that have come into vogue in recent years. The second large question is how to secure adequate compensation for the transportation service they render in order to meet fixed charges, make capital ex-

penditures, and maintain credit. The third question is, how to operate these railroads with the greatest economy and the greatest efficiency and the greatest safety.

I have taken a tremendous interest in reading the report of your General Committee and the report of your various committees and one of the most hopeful signs in the railway horizon is what you gentlemen have done, what you have in mind as to what more you can do.

The great big question now is not what happened in 1929, or 1928, however, but "What is it going to happen in 1930?" On the answer to that question depends in some measure the situation the railways will be in when your meet in 1931.

It is well said that "many a nickle makes a muckle." Bobby Burns said it many years ago and it is true today.

In going through your reports, you can see that you have subscribed to that axiom. I wonder how many people in this country know what it costs in stationery and printing for railroads? In 1929, it cost $29,500,000. I don't know, of course, what you are doing to reduce that. I can only pick out a thing once in a while, but I notice. for example, that one of your committees recommended the making of plain paper, one-half inch narrower and one-half inch shorter. That isn't very much, one-half inch, but I notice it saved one road $5,000 a year. That is quite a bit of money. I notice you have limited rubber bands to five sizes. I know when I was a railroad president, I used to have about a dozen different sizes.

I note further, that your Dining Car Committee, recommends a smaller napkin. I think they took three-sixteenths off each side of the napkin. I see, by using these smaller napkins, one road saved $4,889.

I know that what you have done on those things is only typical of what you are doing in other details. I know that the whole efforts of the division is to provide the things that will produce for the railroads, the greatest amount of revenue. So I want to congratulate you on what you are doing and the line of effort that you are following.

You have 23 committees, and 197 members. Your work speaks for itself. What Mr. Denney said about the value of work on these committees is absolutely true. It is the greatest education in the world. My first connection with the A. R. A. came 30 years ago, when I was a superintendent. I got on a committee, the Train Rules Committee, and I will say that the knowledge I got by contact with other men and by getting their views, was the greatest education that I got out of my railroad service.

There is just one other thing: You gentlemen come here once a year. You sit down here for four days. You go through all the reports of the committees. You pass on them, take a vote on them and then some of you go home and it is all forgotten until next year. I don't think there is anyone who would not be in sympathy with the subjects that you discuss here if you bring them to his attention. As I have told you many, many times, the work of this organization is not finished when you adjourn your meeting. The work only begins there and to sell it to your railroad, or at least have it given consideration.

Report of General Committee P. & S. Division

Reductions in inventories noted——Urge cooperation in developing comparative efficiency figures

The annual meeting of this division, held at San Francisco, June 24, 25 and 26, 1929, inclusive, was one of our most successful meetings. The interest displayed by the members present and the plans perfected by the Committee on arrangements, and the courtesies extended during our stay in the West were very gratifying to your officers and General Committee.

Railway Inventories

Attention is directed to the statement indicating the reduction in material and supplies investment of Class 1 railroads, which was presented by the chairman at the annual meeting of the American Railway Association, at Chicago during November, 1929. This statement is abstracted below as a matter of information.

"In connection with the report of our contemplated activities for the ensuing year, we wish to call attention to the enormous investment in materials and supplies, as well as the substantial reduction that has been made in recent years.

"The annual expenditure for railway supplies of Class 1 railroads in the year 1928 amounted to $1,271,000,000.

"Class 1 railroads show a reduction in materials and supplies account for 1928 as compared with 1927 amounting to $53,000,000.

"The reduction in material and supplies account 1928, as compared to 1920, amounted to approximately $284,000,000.

"These figures are called to your attention with a view of indicating the responsibilities that are placed upon the members of Division VI.

"The proper control of the investment in materials and supplies account is one of the principal functions of this division, and we are of the opinion that a very substantial portion of the reduction in stocks on hand is due directly to the recommended standards of Division VI, which include the simplifying of purchasing and stores practices and approved material handling methods, as well as the co-operation we have received from the using departments."

Railway Stock Reports

Considerable progress has been made with the material stock report during the past year. This is encouraging. It is hoped that railroads not subscribing to this report will send their stock figures to the secretary's office commencing with the next report, which will be as of June, 1930. The report was adopted for the purpose of providing comparisons of material balances on the basis of turn-over and is furnished only to member roads contributing.

Annual Contest

The best papers selected in the annual contest this year and which will be presented by the authors at this meeting, are as follows:

"Products and By-Products of Certain Purchasing Methods," by H. W. Rolston, statistician, office of purchasing agent, the Pennsylvania, Philadelphia, Pa.

"Is Turnover Always of Primary Importance?" by Paul H. Day, requisition clerk, Bangor & Aroostook, Derby, Maine.

Reclamation Activities

Particular attention is directed to the report of the Joint Committee on Reclamation, which consists of representatives from the Purchases and Stores and the Mechanical divisions. This report indicates considerable progress during the year. Very beneficial results will be obtained through the activities of this committee. Further detailed study will be continued by the committee on other reclamation operations during the ensuing year.

Simplified Practice

The Division has continued co-operating with the Division of Simplified Practice of the Department of Commerce, and has been represented at meetings on subjects in which the Division is interested. The Committee on Standardization and Simplification, has obtained much benefit from projects sponsored by that Division.

A Committee on Subjects

The Division has established a Committee on Subjects to receive suggestions on any subjects for consideration by the Divi-

In the Southern Pacific Stores at Sacramento, Cal.

sion. The members are asked to give this committee personal attention when solicited for suggestions. Suggestions should be forwarded to the secretary's office for consideration by the committee.

Standard Practices

Appended to the report of the Committee on Reclamation, is a revised list of Standard Reclamation Practices which should be in the hands of all supervisory forces at reclamation plants. Later on it is expected to issue this in separate pamphlet form.

Railway Accounting

An invitation to attend the 1930 Annual Meeting of the Railway Accounting Officers Association was extended to the Secretary and members of our committee on this subject and the Secretary and the Chairman of the committee attended this meeting.

Committee on Nominations

The General Committee offers the names of the following members as candidates for the Committee on Nominations for the ensuing year:

E. A. Clifford (chairman), general purchasing agent, Chicago & North Western.
A. L. Sorensen, manager of stores, Erie.
W. S. Morehead, assistant general storekeeper, Illinois Central.
H. T. Shanks, purchasing agent, Louisville & Nashville.
L. P. Krampf, supply agent, Missouri Pacific.

The report was adopted as read.

Report on the Classification of Material

Find fourteen roads not following recommended practice——
Catalog additional items

B. T. Adams
Chairman

A questionnaire was sent by the committee to sixty-six railroads requesting suggestions with reference to the classification, and replies were received as follows:

35 Recommended no change in the classification other than additions for new items or transfers from one class to another.
3 Recommended definite consolidation of a few classifications.
1 Recommended changing the preface to permit railroads to consolidate classifications.
14 Advised that A. R. A. Classification was not used by them.
13 Did not reply.

The committee, after considering all of the replies concluded that the classification is being used satisfactorily by a large number of railroads and that the consensus of opinion is that there should be no change in its general make-up, as it can, in its present form, be adapted to the use of those railroads requiring comprehensive details of their stock performance, as well as those desiring a smaller number of classes for their material.

There has been some objection to the final paragraph in the preface reading as follows:

> "The subdivisions of classes are optional and may be changed or revised to meet the needs of the individual roads, but it is recommended that the primary classes be followed, except as changed by the Association."

This paragraph was added in 1925 and should be eliminated, thereby restoring the preface as adopted with the classification in 1922. This action will not disturb those roads now using the classification and should encourage its adoption by railroads employing individual classifications.

Additions to Classifications

The Committee submits the following additions to the classification:

Item—	Suggested Classification
Protectors, switch point	1-A
Springs, rail joint	1-B
Blades, ditch bank	1-C
Hooks, brush	1-C
Trailers, push car	1-D
Pins, channel	2-A
Rods, ground	2-A
Anchors, pole	2-B
Tubes, pneumatic message carrier and parts	2-B
Compositions, paving	3
Explosives	3
Sodium aluminite	3
Columns, oil and parts	9-A
Rods, well	9-A
Ejectors and parts	23-A
Blowers, flue	23-B
Diaphragms, vestibule	24
Alarms, fire and burglar and parts	25-E
Linings, furnace	28
Chairs, dining and office car	36
Fittings, pressure grease gun	45-B
Insulations, prepared for cars and buildings	46
Chemicals, fire extinguisher	47
Compounds, cleaning	47

Transfer of Items

Item—	Present Class	Recommended Class
Tampers, power operated	1-C	9-C
Tools, track—power operated and parts	1-C	9-C
Founts, sanitary drinking	42	36

Item—	Present Class	Recommended Class
Augers, bung	45-A	45-B
Blades, hack saw	45-A	45-B
Borers, bung	45-A	45-B
Cutters, glass	45-A	45-B
Drivers, screw	45-A	45-B
Figures, steel	45-A	45-B
Files	45-A	45-B
Hammers, double faced	45-A	45-B
Handles, adze	45-A	45-B
Handles, axe	45-A	45-B
Handles, hammer	45-A	45-B
Handles, pick	45-A	45-B
Handles, sledge	45-A	45-B
Handles, spike maul	45-A	45-B
Hooks, box	45-A	45-B
Knives, plaster	45-A	45-B
Ladles, melting	45-A	45-B
Letters, steel stencil	45-A	45-B
Lines, mason	45-A	45-B
Lines, tape	45-A	45-B
Measures, tape	45-A	45-B
Rules	45-A	45-B
Sets, rivet	45-A	45-B
Sets, saw	45-A	45-B
Sledges	45-A	45-B
Stamps, steel	45-A	45-B
Tapes, measuring	45-A	45-B
Tools, cleaning	45-A	45-B
Torches, gasoline blow	45-A	45-B

The report is signed by B. T. Adams (chairman), assistant general storekeeper, Illinois Central; E. A. Carlson, division storekeeper, Pere Marquette Railway; E. A. Ernst, district storekeeper, Chicago, Rock Island & Pacific; J. H. Brown, assistant general storekeeper, Canadian National; W. R. Knauer, supervisor stores catalog, Pennsylvania; C. A. Marshall, division storekeeper, Central of New Jersey; F. J. McMahon, general storekeeper, New York Central; W. S. Riach, chief clerk to general storekeeper, Atchison, Topeka & Santa Fe; C. C. Smola, division storekeeper, Chicago, Milwaukee, St. Paul & Pacific; H. J. Smith, chief clerk to general storekeeper, Southern Pacific, Pacific System; E. A. Clifford (chairman ex-officio), general purchasing agent, Chicago & North Western.

Discussion

B. T. Adams (I. C.): The committee on Subject 2, at the recommendation of various roads, has made certain additions to the classification. It has also recommended some transfers from one class to another in order to make the classification a little more consistent and the items agree with the headings of the various classes. Aside from these recommendations, the principal suggestion we have made is the elimination of the final paragraph in the preface to the classifications. This paragraph was added to the classification in May, 1925, and the committee, when making the report at that time, made the following comment:

The only criticism of any importance received both from roads that are using the classification and those which have not yet adopted it is that there are too many classes in the 1922 revised classification and the prevailing opinion is that a great deal of confusion would be avoided by making the use of subdivisions of classes optional.

We have noted that at each succeeding meeting, there has been considerable discussion about the classification and particularly on account of too many classifications. Therefore it is apparent that the addition of the paragraph to the preface as made in 1925 has not eliminated the criticism which the committee then thought would be the case when they recommended its adoption.

We believe that the division has performed its duty in adopting a classification which can be satisfactorily used by the railroads and that they can either extend the classification by subdividing or by consolidating it in order to extend the number without destroying the value in any way for our storehouse arrangement accounting for material or making comparisons with other railroads, and for that reason we suggest the elimination of this paragraph which has been interpreted as preventing the consolidation of classifications.

The Chairman: It looks as if this committee has rounded up a lot of dissatisfaction. We would like to hear some discussions, some action taken on the report.

L. F. Duvall: It says on page 3; "thirty-five railroads recommended no change in the classification other than additions for new items or transfers from one class to another; 14 advised that the A. R. A. classification was not used by them; 13 did not reply; 3 recommended a change in the preface to permit railroads to consolidate classification." It seems that three railroads have influenced this paragraph for some reason or other. That is a small minority to consider in making this change. I would recommend that that paragraph be stricken from the report.

Mr. Adams: The committee was not influenced by three railroads or one railroad. We simply adopted what we thought was a consistent practice. The railroads can take the recommended practice and use as much or as little as necessary Why should we take the material classification and make it an exception to the general practice of the Division? The paragraph that we refer to has not acted in the way that the committee or the Division thought it would. The Classification Committee in 1922, when it compiled this classification, did not include that paragraph in its preface. We belive that it has created a lot of dissatisfaction. It has not accomplished its purpose, and the elimination of it will not in any way effect the classification we are now using or those that may be adopted in the future.

J. U. King (A. C. L.): I will second Mr. Duval's recommendation. In 1925 when that paragraph was added to the preface, a questionnaire was sent out. At that time, seven per cent of those replying desired more classes; 50 per cent desired less classes, and 43 per cent were satisfied. I believe that we ought to leave that paragraph to the preface, because there are some small roads that would not need to divide their classification up into as many subdivisions as the larger roads. And judging from the replies that the committee received this last time, it seems that only one reply was received recommending that the preface be changed. I suppose that refers to this particular paragraph.

We ought to leave the preface to the classification just as it was adopted in 1925.

Mr. Duval: I move that the part that reads: "The subdivisions of classes are optional and may be changed or revised to meet the needs of the individual roads," be stricken out of the report.

The Chairman: It has been moved and seconded that paragraph 5 starting with the words "The subdivisions of classes" be stricken out of the report. All in favor of striking it out say "aye"; those opposed "no."

Mr. Adams: Before you re-put that motion, I would like to see the division go along with the committee. We have come up here year after year and we have had the same dispute. Now, the committee has put an end to all of this criticism. There certainly can be no objection to anyone eliminating this paragraph because it will not in any way effect the classification. You can go back home and use the classification just as it is, you can subdivide it, or, as you have the privilege of doing, you can consolidate it as you see fit. This body has no way of enforcing absolutely its recommendations. It simply makes the recommendations, and the railroads can adopt them as they see fit.

Now, you certainly do not use the scrap classification 100 per cent—you modify it. There is no action of this association that makes it necessary for you to

use it 100 per cent. Therefore, if you are going to make the association use the material classification 100 per cent, you certainly ought to make all of your other recommendations binding 100 per cent by the same kind of paragraph.

The Chairman: The chair is undecided whether the "ayes" or "noes" have it. It will be necessary that we have a standing vote. All in favor please stand.

U. K. Hall (U. P.): The floor does not realize what they are voting on, whether they are voting on the motion that the committee's report be changed, eliminating this item. I don't believe the membership realizes whether they are voting to retain or cut out this paragraph in dispute. I think Mr. Adams should explain it a little more fully.

Mr. Adams: The motion of Mr. King, if the chair will pardon me, is that you strike out from the report all appearing on Page 3 after "the 13 did not reply." If you vote in favor of this motion, that is what you vote to do. If you vote "no" then you sustain the committee.

G. R. Jones (N. Y. C.): My understanding of this report is that the 1925 classification in toto should not remain and that part referring to the subdivisions be eliminated. This question was thoroughly looked into by the 1925 committee. We had lots of discussion. What objections are there to a railroad subdividing No. 1 to suit themselves for their own conditions. What objections would there be to the New York Central subdividing classification No. 2 to meet its conditions?

If you adopt this report as printed and read here, you are going to take that part away from the New York Central.

The Chairman: No, that gives it to them.

Mr. Jones: Why should we not go back to 1925 and let it stand? There is no objection to that. Our discussion at San Francisco last year was in regard to the number of classifications but not to the sub-classifications. Put in as many subdivisions as you want to, but let us stick to the classification—whatever we have.

Mr. King: It may be that the committee and the rest of us are trying to do the same thing. But I can't see how striking out this paragraph from the preface of the classification will impress on the railroads that they can do as they please about the classification.

Mr. Adams: The general trend of opinion is that the present classification prohibits you from consolidating classifications. That is what this particular paragraph was inserted into the preface to mean—that you could not consolidate classifications.

We want to take that out there will be absolutely no doubt as to whether you can subdivide or consolidate to suit the conditions on your own railroad. If you eliminate that, you restore the preface to its original contents in 1922 when the whole classification was adopted.

G. E. Scott (M. K. T.): I recommend that the 1922 preface be read in the meeting here to see that they all understand it.

Mr. Adams: The 1922 preface reads as follows: "The classification was adopted originally by the former Railway Storekeepers' Association, as standard, at its 1910 annual meeting; with certain alterations made necessary by changed conditions it was accepted by Division 6, Purchases and Stores at the 1922 annual meeting. The object of this classification is to secure uniformity in all departments in the organization of and accounting for materials. Also in the preparation of inventories and the rendering of reports of material received, disbursed, and on hand. The more important items are listed in the details of the classification and these with many other standard items, are in the index.

"When reference to this classification will not determine the class, it should be classified with other material used for the same purpose. Additions to the original classification unit changes and re-classified items are indicated by an asterisk."

That is the original preface. Now, the 1925 addition was this: "The sub-division of classes are optional and may be changed or revised to meet the conditions of the railroads. But it is recommended that the primary classes be followed except as changed by the association."

That final paragraph is the paragraph that your committee suggests be stricken from that preface.

J. C. Kirk (C. R. I. & P.): There is one question that I would like to ask the committee, and that is: This wording "primary classes." For instance, lumber. Part of our lumber is maintenance of way and part of it is mechanical stocks. Would the committee recommend that if one railroad wanted to, they could put all lumber into one class? It seems to me that we should not do that. We had not ought to do anything that would distort the general groups. We have four general groups on our classification—"Maintenance of Way" "Mechanical Stocks" "Conducting Transportation" and "General Accounts." Before we vote on that, I would like to hear from the committee as to whether we shall eliminate that paragraph.

Mr. Adams: The committee does not have in mind that class 4A or 4B or 30 will be disturbed in any way. We feel that any railroad that wants to adopt a standard classification will follow it as closely as possible. They may deviate from it a little, they may consolidate classes, but they will follow the general outline as given by the Division. If they do not care to use the 62 classifications, they can group them to any number to suit their own condition.

Mr. King: If we adopt the report as presented, a road can consolidate as many classes as they want to, is that right?

Mr. Adams: No.

Mr. King: Don't you think it would have that effect if we do adopt it?

Mr. Adams: It didn't have that effect from 1922 to 1925. We adopted it in 1922 in its entirety.

Mr. King: The point that the committee wants to get over is that classes can be consolidated. If we adopt the report as presented, it seems to me that will give any railroad a chance to consolidate as many classes as they want to and still say they are all classified.

Mr. Adams: They can do that. It is only a recommended practice. There is absolutely nothing binding about it. They can do it with that paragraph in there.

The Chairman: All in favor of eliminating the paragraph that the committee recommends make it known by rising.

About twenty arose.

The Chairman: All in favor of the committee's report as submitted please stand.

About seventy arose.

The Chairman: All in favor of the motion eliminating the paragraph in the report please rise.

About twenty arose.

The Chairman: All in favor of the committee's report as recommended please rise.

The vast majority arose.

The Chairman: *The committee's report is carried.*

Report on Store Department Rules

Loose leaf record recommended———Inventory card index method under study

H. R. Toohey
Chairman

The committee is unanimously in accord that the book of rules should be reprinted in loose leaf form and corrected to include all changes approved up to the 1931 annual meeting. The committee of 1931 should give close study to necessary changes and revisions to be made in the Book of Rules and after the report has been approved a loose leaf form should be arranged for.

The committee has given some thought and study to the methods of taking the annual inventory, but has not progressed far enough to make any definite recommendations. However, it is suggested that future committees give some thought to the methods used in connection with the inventory differences.

Some time and thought was given to the general storekeeper's office organization and the manner in which the details are handled on the various railroads now handling the accounting for material. While on some roads division accountants handle the accounting for the stores department, some stores departments are doing their own accounting. It is the opinion of the committee that regardless of where the accounting is done the accounting department has full control of the methods and the practices used.

The committee made a brief study to consider the method known as the Panel Card method used by the Canadian National versus the present stock book method for controlling stock. It reviewed the paper submitted by L. C. Thompson and has also examined forms and photographs. This subject is giving satisfactory results on Canadian National lines. All adopted practices were at one time untried and we believe that this method should be given considerable thought and study.

The report is signed by H. R. Toohey (chairman), inspector of stores, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.; J. H. Ellis, storekeeper, Chicago, Burlington & Quincy, Hannibal, Mo.; J. F. Rex, division storekeeper, Union Pacific, Kansas City, Kan.; and E. G. Ellenberger, general material supervisor, Pennsylvania, Philadelphia, Pa.

The report was accepted.

Report on Stores Accounting Practices

Comparative statistics of classified inventories and stock turnover get more converts

C. H. Murrin
Chairman

The Committee on Comparisons of Materials Stock Reports and Stores Expenses has been organized on a regional basis with one member from each of eight regions as follows: New England, Great Lakes, Central Eastern, Southern (including the Pocahontas Region), North Western, Central Western, South Western, Canadian Lines.

The purpose of this regional composition was to enable a systematic presentation of the purpose of the Material Stock Reports, as a means of making constructive inter-company comparisons of materials, inventories and turnover.

Two committee meetings were held during the year, the first in Chicago on October 29 and 30, 1929, and the second in St. Louis, Mo., on April 4, 1930. At the first meeting it was arranged that the respective regional representatives would exert particular effort to acquaint all railroads with the functioning and value of the Material Stock Report plan and to increase participation, effective with the semi-annual returns as of December 31, 1929.

The processes were left to each regional representative, it having been agreed that the desired contact with purchasing and stores officers might be accomplished through personal visits or correspondence or through regional meetings held at convenient locations. To minimize handicaps experienced in canvassing carriers on this subject, it was agreed that regional representatives would use American Railway Association—Purchases and Stores—Division stationery for direct correspondence with carriers.

Furthermore, with a view to producing greater uniformity in the form of returns, and to establish the Material Stock Report as an American Railway Association practice in which all may participate, it has been printed as a standard A. R. A. form with instructions as to preparation, forwarding and disposition of the returns. These printed forms have been distributed and are available to all carriers.

Eighty-two Roads Report

The effort put forth by regional representatives in connection with the returns as of December 31, 1929, were productive of excellent results. The December 31, 1929 returns showed an increase over the June 30, 1929 returns as follows:

	June 30, 1929	December 31, 1929	Per cent Reporting Class 1 Totals
Number of Class 1 Roads reporting.	56	82	54
Class 1 Road mileage reporting.....	136,421	171,191	71

The time available was insufficient to give much attention to two incidental features of reports submitted by carriers. These are (1) a reconciliation of returns to insure that the common formula is followed in computing turnover and (2) the separation by the group total of various lump sum figures submitted. The two features are deserving of study and it is recommended that next year's committee be so organized on a regional and sub-regional basis that each member will only be assigned roads with which proper contact can be maintained.

Regardless of present discrepancies in the figures reported, and the delays in receiving figures the Material Stock Report to date has permitted individual railroads to make comparisons and investigations which have been beneficial. The interest manifested in comparing inventory and turnover performances, as an aid to progress, will automatically operate to minimize such discrepancies and delays at their source.

The fact that the returns have been voluntarily submitted by roads having 71 per cent of the total road mileage of Class 1 railroads plus approximately 23,000 miles of road in Canada would seem to forecast a gradual diminishing of the present non-participating mileage.

Store Expenses

The committee, recognizing the value of constructive comparisons of materials procurement and distribution costs, and realizing that uniformity as to the elements of expense charged to such operations is very important, gave particular consideration to Store Expenses at its first meeting. A tentative form was made of the expense items, related to designated materials and supplies operations, to be included in Store Expenses with a similar form of the items to be excluded. This tentative form was sent to the General Committee. Progress can be reported in making inter-road comparisons of purchasing and storekeeping operation costs of greater value for managerial purposes, but there is much joint work ahead on this particular subject.

The report is signed by C. H. Murrin (chairman), special accountant, Illinois Central; O. L. Browne, assistant to purchasing agent, Atlantic Coast Line; O. A. Donagan, general storekeeper, Boston & Maine; D. V. Fraser, assistant purchasing agent, Missouri-Kansas-Texas Lines; E. Harty, assistant general storekeeper, Southern Pacific, Pacific System; J. T. Kelly, general storekeeper, Chicago, Milwaukee, St. Paul & Pacific; L. Kilmer, chief accountant, Grand Trunk Western; W. W. Morris, assistant general purchasing agent, Pennsylvania; L. Sutherland,

general storekeeper, Pittsburgh & Lake Erie; A. L. Sorensen (chairman ex-officio), manager of stores, Erie.

Discussion

C. H. Murrin (I. C.): Since the report of this year's activities was compiled, the tabulation of Material Stock Reports as of December 31, 1929, has been completed and distributed to participating railroads, in accordance with the plan approved by the Division. The figures embraced approximately 72 per cent of the aggregate value of materials on hand on all Class 1 railroads as of that date, excluding lines in Canada.

The aggregate of the total values of unapplied materials reported by various roads was $382,005,126. Disbursements and the turnover performance were reported on $366,359,708 or 96 per cent of this total.

An aggregate value of $344,963,219, representing materials on hand, was reported for 33 roads, or systems, each of which reported total materials on hand valued at $2,000,000 or more. The total average monthly disbursements reported for this group was $117,225,133, or an average of $3,907,504 per day. Based on such daily disbursements, the total materials on hand for these roads represented 88 days' supply.

An aggregate value of $21,396,489, representing materials on hand, was reported for 36 roads, each of which reported total materials on hand valued at less than $2,000,000. The total average monthly disbursements reported for this group was $7,153,372, or an average of $238,446 per day. Based on such daily disbursements, the total materials on hand for these roads represented 90 days' supply.

Both groups combined, or 69 roads or systems with a total on hand of $366,359,708, reported disbursements averaging $4,145,950 per day, which represents an aggregate of 88 days' supply. In other words, for each decrease of one day's supply, which means that much quicker turnover, the aggregate value of materials reported on hand would decrease $4,145,950, and at 15 per cent each day's reduction would represent a saving of $621,892 in carrying charges.

Matching reported disbursements with the annual operating expenses of each road showed that transfers may have been included in several instances, but such indications were not entirely convincing. In this connection it may be stated that observance of instructions on the printed A. R. A. form mentioned in our committee report will insure a uniform stating of disbursements.

Again, it may be felt that some on hand figures are low account advance charging out of materials, thus inducing a better turnover ratio. If true, that is a matter of individual policy, the value of which will likely be decided by the advantages to be gained from measuring returns which are directly comparable.

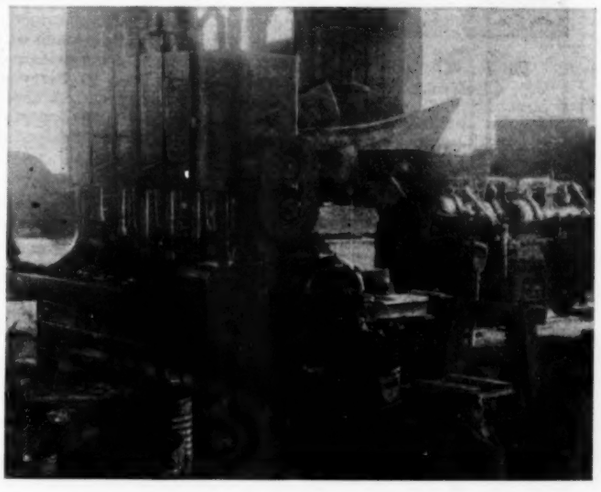
(*The motion was made and passed to adopt the report as read.*)

The Chairman: We have as our guest this morning, the secretary of the Railway Accounting Association, E. R. Woodson. If he is in the room, I'd like to have him say a few words to you.

E. R. Woodson: The two subjects embodied in the committee's report just presented have been under discussion by our Association from time to time.

We were very happy to have had the opportunity and the privilege of cooperating with your committee, in the formative stage of the first subject, involving the comparison of material balances. Now that that subject has progressed to the point where it involves the actual application of these comparisons and making these reports, it of course very properly becomes a subject largely or entirely to be handled by your division or by your committee. We are, of course, very glad to cooperate with the division or with your committee in any way that we can.

The second subject, material store expenses, may be somewhat new to the division. It may not be altogether understood. As you all know, in the present accounting classification, material store expenses are handled through a clearing account, known as material store expense. There is also a clearing account for stationery store expenses. There are other clearing accounts. The clearing accounts are, of course, in the nature of cost accounting procedure, distributing the expenses to the particular items involved, rather than have them remain in the clearing account. Our committee in charge of the revision of the accounting classification, long ago recommended to the Interstate Commerce Commission that all of these accounts be abolished and that they be made into primary accounts, into which the expenses would go and would stay. In other words, material store expenses and stationery store expenses would be combined into one account, called material store expenses,



Reconditioning Nuts on the Union Pacific

and would be a primary account. The expenses would go there and woud remain instead of following the present plan of being distributed according to the material, and so forth.

That suggestion not only relates to that particular clearing account, but also to the other clearing accounts in the classification and was submitted to the Interstate Commerce Commission both in our Association, involving the tentative accounting classifications, and also as a part of the formal hearing before the Commission held some months ago. That hearing is now under consideration by the Interstate Commerce Commission and according to the latest reports, the Commission hopes to get out its report before the summer recess, which will probably be some time in August.

We have no idea of what action the Commission may take. In the proposed report Commissioner Eastman recommended adversely to the creation of the primary account for material store expenses. In other words, he recommended the continuation of the present method of handling these expenses through a clearing account. Whether the Commission will take the same position or will go along with us in our recommendation for creating a primary account, which I understand is the

desire of your Committee, no one could possibly say at this time.

There is not altogether a unanimity of opinion as to the desirability of creating primary accounts in this connection; nor is there any very widespread agreement as to the advantages and disadvantages of the clearing accounts. From an accounting standpoint, we are not altogether in agreement. Some accounting officers have views in one way and some have others.

Report of Committee on Forest Products

Trade conditions, progress in standardization, and other developments of interest to buyers explained in masterly report

D. R. Elmore
Chairman

In the purchase and procurement of forest products, the loading of cars to capacity can best be obtained by specifying on all orders that cars are to be loaded to full cubical or weight carrying capacity, and by ordering in quantities that will coincide with this requirement. Where units other than carloads must be used, the quantities specified should be regulated, consistent with the requirements, so that in the aggregate they will lend themselves to capacity loading of equipment. To insure that the desired results are obtained, a careful scrutiny should be made of all shipping documents and inquiries made wherever shippers fail to carry out their part of the program. A careful study and application of these ideas present profitable opportunities for the practice of efficiency by purchasing and stores officers.

Moisture

The A. R. A. standards for lumber, adopted as recommended practice in 1910 by the Master Car Builders and Master Mechanics, made no reference to moisture content. It was generally understood that softwood car lumber should be dry in the common acceptance of the term as exemplified in the kiln drying of the period. No moisture restriction was placed on car flooring, framing, or sills. The saving in freight charges was the basis for any drying these items got.

Moisture contents first became part of the A. R. A. recommended practice when the Mechanical Division in 1926 adopted the report of the Committee on Car Construction—Circular No. D. V. 459, pages 11 and 21—prescribing a maximum of 12 per cent moisture for finished patterns of thicker stock such as decking and a maximum of 10 per cent moisture for thinner patterns such as roofing, siding, lining and sheathing. There have been no subsequent changes. Information reported to our committee by forty-one railroads indicated that over 20 per cent have adopted these restrictions.

Railroads desiring to adhere to the A. R. A. moisture restrictions should make these a part of their lumber purchase contracts. They should also take steps to insure that these restrictions are observed by testing samples from each shipment. Such lumber should be stored under cover and protected against absorption of moisture in excess of the A. R. A. maximum.

The shipping weight of lumber exerts considerable influence on its final cost and the committee urges that its 1928 report recommending that purchases be made on an f. o. b. mill basis in order to take advantage of "underweights" be reviewed by all who are not so purchasing.

Dried Lumber

All kiln dried lumber should be put into enclosed sheds to properly protect it from taking on moisture. In some sections, heated storage is necessary.

In issuing dried stock to the Mechanical Department, only such quantities as can be daily applied should be delivered in order to avoid unnecessary exposure. Should any be left over at the close of the day, it should be covered or moved into a shed.

Frequently, when shrinkage occurs after lumber is applied to cars, reports are made that such lumber was not properly dried. When this shrinkage occurs, it is usually the result of undue exposure of dried lumber to moisture after its removal from the lumber shed and before it is applied and painted.

Specifications

On July 1, 1929, the West Coast Lumbermen's Association discontinued the standard classification of grading and dressing rules in use since 1922, and commonly known as Rail 2, for a set of grading and dressing rules No. 9, based on American Lumber Standard sizes and grades, incorporated in which were details for railway and car material. On January 4, 1930, they notified the trade that inspection and reinspection by the Association is to be done only on Grading Rules No. 9 after March 1, 1930, and based the decision on the fact that the rules had been in effect long enough to permit proper adjustment of purchases and stocks to the new rules. In further explanation the Grading Rules Committee of the W. C. L. A. stated that retailers, wholesalers, railroads and car building companies and other interested groups, including producers and consumers, who assisted in formulating the No. 9 Grading Rules have again co-operated in accepting the new rules as meeting all of their requirements.

The Southern Pine Association is continuing to use its edition of car material specifications dated July 1, 1919, and advises that these conform as closely with American Lumber Standards as do those of any other regional group.

The committee understands that the Mechanical Division's Committee on Specifications and Tests, is working on a report which will recommend grades of lumber for use in cars and which probably will follow American Lumber Standards in its general provisions and definitions, and it is not therefore expected that there will be any difficulty in obtaining the approval of the various regional groups of lumber producers. This will bring about a common understanding and application of grades of lumber for railway equipment. From the buyer's standpoint, this uniformity is necessary in order to purchase on the most economical basis. Information reported to the committee indicates that the majority of railroads now follow the specifications issued by the various regional lumber groups.

In the Timber Yard of the Burlington at Galesburg, Ill.

American Lumber Standards

Each year since 1923, excepting 1929, reference has been made to the simplification of lumber sizes and terms developed under the co-operative effort of manufacturers, distributors, and consumers into what are known as American Lumber Standards. There were no changes to report in 1929. In 1925 the Purchases and Stores Division adopted the American Lumber Standards as they stood at that time, and in 1927 and 1928 adopted the revisions which had been made. The Engineering Division also adopted American Lumber Standards which provided specifications for structural grades in 1926. American Lumber Standards have advanced to a fourth edition in Simplified Practice Recommendation R-16-29. This edition brings some significant changes. (The changes are contained in the committee's report.)

Simplification of Sizes

One railroad reports a reduction of 33 per cent in the number of different sizes of lumber carried in stock; another road reports elimination of 780 sizes, or 22 per cent of the whole during the past six years. Two roads report a reduction of 20 per cent, and two a reduction of 10 per cent. Others report eliminations ranging from 29 to 200 different sizes, and nearly all roads indicated an unusual interest and activity in this subject. The reduced investment, with its attendant saving in carrying charges, decreased handling costs and easier procurement, and many similar advantages derived from a standardized list of lumber sizes reduced to the minimum, outweigh many times any slight loss from mill waste, and deserve the attention of those who are not yet taking full advantage of these possibilities.

Treated Lumber

The decision as to when and where treated lumber shall be used rests with the departments responsible for maintenance construction and operation, but when the decision has been reached to use it, the purchase, storage and handling is a direct responsibility of the Service of Supply. To the end that the greatest possible economy may be effected from its use, our responsibilities require a thorough knowledge of sources of supply, and how and when best to obtain, handle and issue treated lumber.

Lumber Stocks on the Great Northern at Great Falls, Mont.

There are obstacles to the preservative treatment of lumber, especially for rolling stock, which arise from the necessity of framing before treatment and the use of non-odorous and non-staining chemicals in certain types of car equipment, but the economies of lumber treatment are being so thoroughly demonstrated that these problems may be expected to be shortly solved.

Grade-Marking and Trade-Marking

Grade-marking of lumber, which provides for recording the judgment of the expert mind at the mill by marking every piece of a given grade with an easily branded mark or insignia indicating precisely its quality, has passed the experimental stage and has become an established practice in the lumber industry.

During the past year the lumber grade-marking movement received very great impetus through instructions issued by the chief co-ordinator of the United States to the heads of all Government departments and agencies to invite bids on grade-marked lumber whenever this material is obtainable for Government use, and to give preference to grade-marked lumber in cases where other conditions are equal.

The use of Association trade and grade-marks by subscribers to the West Coast Lumbermen's Association was stimulated during the past year with the registration of the West Coast trademark at the U. S. Patent Office and the adoption by the trustees of a definite policy for licensing its use. Twenty-three member mills were licensed to use it in connection with standard grade symbols and have arranged to apply it on all or a part of their output. Others have advised of their intention to adopt its use as soon as plant details are satisfactorily worked out. Southern Pine Association reports that some of their subscriber mills grade-mark all of their lumber and that all of them grade-mark when requested so to do.

The committee has found no reason to change its previously expressed judgment that grade-marking is a forward step in the lumber industry, but should not be accepted by the railroads in lieu of inspection. Neither should the railroads express a preference for grade-marked lumber. There are many in the lumber industry who are not yet grade-marking their products, but who are striving earnestly to produce and furnish quality material. To give preference to grade-marked material under such conditions would be not only discriminatory, but likely to prove detrimental to purchasing efficiency.

Certificates or Car Cards

Certificates or cards are a recent development in the lumber industry and are intended to be issued by the manufacturer, enclosed in waterproof envelopes and placed inside the car to give the consumer a record of the size, grade and tally of the stock contained in the car as it was loaded at the manufacturer's plant. This shipper's certificate of lumber quantity and classification was first adopted in 1928 by the mills composing the Northern Hemlock and Hardwood Manufacturers' Association and subsequently 75 per cent of America's largest lumber mills through acceptance and approval of the principle by their respective associations.

The actual use of these certificates and cards is being commenced in various producing areas, and during 1929 eighteen West Coast and several Southern pine mills commenced the use, some on all of their rail shipments and others upon particular grades or classes of business. Several mills using this system have advised their associations that its use apparently has practically eliminated small claims which have been a common source of loss and annoyance to shippers.

A. R. A. 1928 Alternate Car Patterns

In compliance with a request originating with the Mechanical Division for information as to what, if any, saving can be secured to the railroads through the use of the new lumber sections, the committee was authorized to conduct an investigation of the price feature. The results are given in detail in Appendix B, of the report.

It is important that those interested in taking full advantage of the opportunity to use these new patterns have a clear understanding of them and their relation to the M. C. B. patterns. One railroad reported that it had not considered the alternate patterns because of the duplication of stock that would arise. This, of course, is a mistaken idea, as will be readily seen by a comparison of the patterns. The difference is in the finished width. The A. R. A. alternate patterns have less face width by the following amounts: For square edge flooring, ¼ in. for narrow section to ½ in. for wide sections; for shiplap lumber with ½ in. lap, 5/16 in. to ⅜ in.; for siding and tongue and groove flooring with ⅜ in. tongue, 3/16 in. to ¼ in.; and for tongue and groove siding, roofing and sheathing with ¼ in. tongue, 0 in. to 1/16 in. It is claimed that these differences in widths are largely due to the more severe restrictions imposed by the specification for moisture content recently adopted by the A. R. A. Other differences are of a minor nature, such as making an offset for insuring a tight fit at the groove, curving the edge of the tongue, etc. The sections are entirely interchangeable and may be matched and used together without any difficulty whatever.

The new sections agree with the sizes and workings of the American Lumber Standards which have become effective since 1925 for yard lumber used in building construction and it is contended by the manufacturers that the adoption of these sections by the railroads will result in economy on account of mass production. In other words, the M. C. B. patterns, the A. R. A. alternate patterns, and the American Lumber Standards patterns will interchange and there is no necessity for carrying additional or separate quantities of these materials whether one, two or three are used.

The report is signed by D. R. Elmore (chairman), assistant to general manager, Fruit Growers' Express; C. S. Burt, super-

intendent ties and treatment, Illinois Central; L. V. Guild, purchasing agent, Oregon Short Line; F. S. Hillier, tie and timber agent, New York, Chicago & St. Louis; L. W. Kistler, superintendent treating plants, St. Louis-San Francisco; F. C. Krell, forester, Pennsylvania; A. J. Kroha, assistant general storekeeper, Chicago, Milwaukee, St. Paul & Pacific; A. F. Latta, lumber buyer, Canadian Pacific; J. R. McGrenara, general tie & lumber inspector, Atchison, Topeka & Santa Fe; J. E. McNelley, chief tie & lumber supervisor, Atlantic Coast Line; A. J. Neault, assistant to general purchasing agent, Chicago & North Western; F. V. Weisenburger, timber agent, Northern Pacific; C. C. Kyle (chairman ex-officio), purchasing agent, Northern Pacific.

Discussion

(The report on forest products was outlined by committee chairman D. R. Elmore, Fruit Growers Express, who also read a resolution adopted by the West Coast Lumber Men's Association and the Southern Pine Association, after which the committee report was accepted without further discussion. T. M. McKeown, assistant purchasing agent, C. P. R., was then called upon and read a special paper on lumber buying prepared by A. F. Latta, (C. P. R.), who was unable to be present. The resolution, which was in effect on endorsement by the lumber industry of the Alternate Patterns for car lumber adopted by the A. R. A. in 1928, was as follows.

Whereas the American Railway Association through the action of its Division V, Mechanical, adopted in 1928 as alternate standards certain sections of our lumber which conform to the patterns of the American Lumber Standards and in 1930 recommended the continuance of these sections as alternate standards, and

Whereas the American Railway Association, Division VI, Purchases & Stores, reports in 1930 that the prices at which these A. R. A. 1928 sections can be purchased are lower than the prices which would have to be paid for M. C. B. 1910 patterns at equivalent moisture content.

Be It Resolved that the West Coast Lumbermen's Association endorses the A. R. A. 1928 sections as desirable from the viewpoint of production and merchandizing, and concurs in the conclusion that they are more economical than the M. C. B. 1910 sections.

Be It Further Resolved that if the American Railway Association will adopt the sections recommended by the Mechanical Division as standard the West Coast Lumbermen's Association will feel free immediately to promulgate them as the standard of manufacture for its members wth the conviction that in the production and use of these sections, there will result a lowered cost in construction and repair of railroad cars.

Buying Lumber for the Railways

Importance of experience and value of standards explained in special paper

By A. F. Latta

Lumber Buyer, Canadian Pacific, Vancouver, B. C.

Forest products constitute at least one-fifth of the total value of railway purchases, excluding fuel and rail. This large amount exemplifies how important it is to the railroads to have lumber specialists on their purchasing staffs. The lumber buyer of the Canadian Pacific is employed in an advisory or auxiliary capacity on lumber to the company's local purchasing agent and, of course, in the district only from which the bulk of its lumber supply is secured. In general lumber supplies it purchases special cutting approximately equal to the output of a mill with a capacity of about 300,000 ft. per day. This, of course, excludes ties.

The lumber buyer should always be informed on market values, for it is on this basis that the value of marketable lumber is first established, allowing, of course, for the usual fluctuations of supply and demand. He should be able to go into a mill yard and select material which would be suitable for his own class of orders. Mills cutting from 40,000 to 80,000 bd. ft. per day often have lumber piled in these yards that is slow selling and which can often be purchased substantially below market prices. A lumber buyer should also understand the different types of mills and operators. In a broad sense it is immaterial what the approximate market price on some of the items of yard stock is, because up to the present it has not been found feasible or possible to obtain a standardized price on all classes of lumber from the varied types of mills and maintain that level. For that reason a comparative price sheet with competitive prices per 1,000 ft. does not always tell the lowest price that some stocks could actually be purchased at.

Buying on the Ground

It will be found of distinct advantage for a lumber buyer to keep his own counsel of the quantities he is prepared to purchase until all his quotations are received, for the reason that bulk inquiries on certain classifications have the effect of materially increasing the price.

In going through a lumber yard a buyer should bear in mind, to a large extent, just what class of material he is looking for, because if he should see it in the stocks on hand and get the mill operator to name a price, usually he will receive an offer which will be lower than any quotation the buyer could possibly receive by telephone or mail. Many of the wholesalers' inquiry sheets, when sent out to the mills, make a straight offer per 1,000 ft. for the material they require, and in quite a number of instances they buy the material at the price they set. To be able to do this, it is absolutely necessary to have a thorough knowledge of the lumber business and general market value.

A buyer of lumber should also have a good idea at any time as to the most suitable place to buy the grade he is looking for. This is knowledge gained only by years of experience. Standing timber in the Pacific Northwest is good, bad and indifferent in all localities, yet certain districts and stands of timber are much more suitable for a particular class or grade of lumber than others.

The Small Mill

Many buyers are under the impression that lumber bought from a large mill is superior. Generally, an equal grade of lumber can be purchased from a small or medium mill. Nature did not favor the man who bought 20 sections of timber any more than the man who bought one. Both stands of timber will contain good, bad and indifferent lumber. The large mill will have more efficient grading, but this is not altogether an unmixed blessing, as there is the risk of mills taking everything allowable out of the specified grade, thus enabling them to increase their total average of uppers or clears. Again the small mill will also occasionally have indifferently sawn stock, but if a railroad is buying the material in the rough to re-manufacture in its own shops, there is no objection as long as the dimension is full enough for re-manufacturing purposes, and excessive freight is not paid because of excess weight in transit. Moreover, where the inspection is final at destination a penalty for under-grade lumber is exacted that will soon have the effect of encouraging more care when grading material, and, if the material is inspected at the mill, the company's inspector automatically rejects what he does not believe to be up to grade or size.

No attempt should be made to purchase any tie requirements below an equitable price from mills that cut ties entirely. A tie mill, as a rule, sells only ties or lumber of the same grade and has nothing to make up the loss in selling below actual cost. It is good policy, moreover, for the tie buyer to keep all the mills he can, cutting ties on his line, as the more mills operating the keener will be the competition.

Buying Car Decking

It will occasionally happen in a mill that a good timber log will, as sawn towards the heart, make excellent car decking. To ask a mill built on a production basis to break down its logs to produce lumber suitable for car decking is entirely out of the question, because, likely, in one log only a proportion would prove of a satisfactory grade for the purpose and the balance would have to be thrown back into common stock. There is no price at which the average large mill would even consider accepting this business in good times, if for no other reason than the loss of production it would entail.

The mill cutting ties in the proper stands of timber is valuable as a source of this material, however. A lumber buyer understanding his business with ties and decking used in combination can always purchase these at a price which no large mill could hope to meet, because it is often below the average price of their logs.

Prices and Weights

In buying on foreign lines a lumber buyer should endeavor to acquaint himself with the actual weights of the finished product he is purchasing. This he can do by a careful study of the weights shown on the bills of lading, the original of which should be attached to all sets of invoices. It is surprising how soon he will identify the districts where the material can be obtained at the lowest weight. In the summer season a foreign line buyer should try to purchase f. o. b. mill and give his company the benefits of the saving in freight that may be derived thereby. In winter he should reverse the method and endeavor to set his price on standard guaranteed weights. This will equally protect his company. Trying to buy along these lines is perfectly legitimate. A lumber salesman will not hesitate to charge any possible underweights per 1,000 ft. to the price of his product to which he believes himself entitled.

Standards Pay

Grade marking invites attention. The more conditions you endeavor to place in lumber specifications the more you will circumscribe or curtail the territories from which you can draw lumber requirements and eventually the more you will pay per 1,000 ft. for lumber. I would suggest proceeding warily in adapting grade marking. I do not see in it any advantage to the American Railway Association. We should, however, endeavor to meet the mills' requests by adopting standard general sizes where possible. This action would help to keep up their production and, in cases where material is rejected, it could be taken back into stock without severe losses to the mill.

Mechanical departments should be persuaded to use 25/32-in. car sheathing and roofing. This is the commercial thickness of the material in Canada and should be accepted as standard in the United States. It will result in lower prices for the railroads that I believe would greatly offset the loss in strength from the 1/32-in. that is at present demanded in vertical car sheathings and roofing.

Early in April I obtained from the Washington district a price of $22 per 1,000 ft. for a carload of 25/32-in. B. & B. kiln dried clear fir car flooring and at the same time a price of $40 per 1,000 ft. was asked for a carload of 13/16-in. by 4-ft. by 9-ft. outside car sheathing. Both cars of material are identical as to grade and kiln drying, yet there is a difference in price of $18 per 1000 ft. The carload of railroad material was of one length only, but the extra charge on carload lots on commercial sizes for specified lengths in some classifications of lumber is often only $2 per 1,000 ft. If these special lengths are worth from $5 to $8 per 1,000 ft. at the highest figure, this still only brings the cost of this stock to $30 per 1,000 ft.

The railways can save over a million dollars annually if they would adopt the 25/32-in. as the American Railroad standard for car sheathings, roofings, and inside car linings. Every mill in the country that has dry kiln facilities would then become a potential source of supply for this class of railroad material, due to the fact that it could be automatically obtained from their commercial stocks. Furthermore, owing to the enormous amount always in the course of production, the price of car sheathing would be the actual market price of commercial floorings, plus only the additional cost for the special lengths.

For general purpose use, it should be the endeavor, wherever possible, to utilize random length material, instead of specifying special lengths. Any assistance we can lend the mills by accepting the mill run of widths and lengths will automatically benefit the railways by reducing costs and should, therefore, have the whole-hearted support of all railway purchasing agents.

On motion the paper was received and placed in the proceedings with thanks to the writer.

Report on Methods of Conserving Materials

New committee tells how several roads secure employee cooperation in waste avoidance

U. K. Hall
Chairman

With a view of engendering a spirit of greater interest and study on the part of users of material, it is the purpose of this committee to point out to railroad managements that augmented conservation and economy are possible through the adoption of special methods to that end. The methods are found in reports from various roads describing how they have organized in the interests of conservation.

Regular Committees on One Road

One road inaugurated a plan for definite study in the promotion of conservation methods in the use of materials early in 1925 with the appointment of a general committee composed of the assistant to the president as chairman, the purchasing agent, the chief engineer, the assistant to vice-president in charge of operation, and the assistant comptroller, as secretary.

This general committee was charged with the duty of making observations in the use of material and supplies, and to recommend the correction of any waste or improper practices. This committee in turn appointed sub-committees to specialize in the study of the problem in the maintenance of way and structures department, the car department, the locomotive department, and in handling material and supplies used in station, train and engine service. The general storekeeper is ex-officio member of all sub-committees.

As a basis for study and consideration of the sub-committees, the following suggestions were offered them in carrying on their work:

1. Make periodical inspections and studies of repair and construction work to determine if material is being economically used.
2. Recommend changes in practices to effect savings in the use of materials.
3. Observe the kind and quality of material used, and make recommendations with respect to the use or non-use of second-hand material and the use of higher or lower grade materials, whichever will serve the better purpose at the least expense.
4. Observe and report cases where items of material on hand are in excess of actual requirements.
5. Suggest further uses for any obsolete material observed.

All subjects handled by each sub-committee are carried on a docket and assigned individual numbers, the numbers used by each committee carrying a prefix, and all reports of activities of each committee are reported as far as possible according to docket numbers, the committee reporting: First, the nature of the subject; second, investigation or inquiries made concerning the subject; and, third, the disposition of the subject.

When a committee discovers conditions which in their opinion need correction, they first discuss the matter with local supervisors or the head of the interested department, and, if a correction is decided upon, the subject is reported to the general committee in a bi-monthly report. Where practices are discovered which in the opinion of the committee need correction, but cannot be decided locally because of standards or existing practices, etc., a report is made to general committee by letter, stating the nature of the subject, investigations or observations made, and action taken; a copy is furnished to the head of the department interested, requesting him to advise the general committee of his recommendations, after which the matter is considered by the general committee with the head of the interested department.

The individual sub-committee chairmen also plan the necessary propaganda for furthering the cause of material conservation, particularly with respect to adopting slogans for posting at appropriate points in a manner somewhat similar to the plan followed by the Safety First Committee.

Meetings are held by each sub-committee as each sees fit, but not less frequent than once every two months, and reports are made to the general committee on the first day of July, September, November, January, March and May of each year.

The sub-committee personnel is changed partially each year to interest a greater number of employees and officers in the work.

The road has found that in handling the work through the various sub-committees and the general committee it overcomes any departmental feeling that may arise as a result of em-

ployees from other departments offering suggestions and the results accomplished have been attended with the greatest harmony of feeling. Since these committees have been established several hundred items have been considered which were avenues of conservation and practices promoted that are estimated to have saved thousands of dollars each year.

A Bureau of New Ideas

A second road has established a bureau known as the Bureau of New Ideas, which is under the direct supervision of the vice-president of personnel. There are no restrictions placed upon the kind of suggestions and all those submitted are considered by the department interested, and the person making suggestion is advised in writing of the decision reached.

All suggestions or new ideas submitted must carry a full explanation of what the idea is, how it is to work in practice, and what the employee believes it may accomplish. Sketches or diagrams must be on separate sheets of paper.

The employee's name, occupation, location and home address must be included in these suggestions. The name of the employee submitting same is not revealed without his consent. Acknowledgment is made to the employee at his home address.

All suggestions are referred to the general manager or assistant vice-presidents involved, who made investigations and return their findings to the bureau through their respective vice-presidents. Upon the return of the suggestion to the bureau, definite recommendations must be made as to the adoption of the suggestion, in whole or in part. If the suggestion is not approved, the report should state the reason for such conclusion. The employee submitting the suggestion is advised of the conclusion, and if the suggestion is adopted he is paid a reward.

This arrangement has been in operation for two years and the railroad company has received some valuable suggestions and considerable economy has been effected as a result of the adoption of the suggestions submitted.

Methods on Road C

A third road has what is called a Waste Avoidance Committee. Each operating division has a local waste avoidance committee consisting of the division engineer as chairman, with the master mechanic as vice-chairman, and other members including train masters, road supervisors, the supervisor B. & B., supervisor of Water Works, signal supervisors, the division storekeeper, assistant engineer, general foremen of locomotive and car departments, supervising agent, traveling engineers, etc.

These committees usually meet every 30 or 60 days, discussing conditions on their divisions where waste of all kinds can be avoid. Minutes of each meeting held are reported to the general manager and other general officers interested, as well as to the members of the General Waste Avoidance Committee, consisting of the assistant engineer, maintenance of way as chairman, the superintendent of water service, the engineer of buildings, the shop engineer, all district engineers, the assistant general storekeeper, assistant purchasing agent, superintendents of motive power superintendent of fuel conservation, and the fuel conservation engineers.

These officers meet every 90 days and handle all subjects which the local division officers are unable to settle.

The chairman of the general committee prepares minutes of each meeting which are submitted to the general manager and a copy is mailed to the local division members, so that they are in position to know how the subjects referred to general committee are settled.

While no figures are submitted showing the actual savings effected by the efforts of these committees, it is generally felt that a great deal of good is being accomplished.

A Surplus Committee on Road D

For a long time a fourth road has had a committee to go over the items which were considered surplus or unusual, and on the recommendation of this committee the items were scrapped. This committee has gradually changed the nature of its work so that it is more a committee to recommend other uses for surplus items. The committee not only considers surplus or obsolete material, but any slow-moving material, and endeavors to find other uses for them. This committee has always had a stores department man as chairman, usually the traveling storekeeper. It consists of a representative from the vice-president's office, the man who is in charge of all of the patterns on the system, and others interested in particular materials under consideration are included from time to time.

Road E Studies Repairs

A fifth road has attempted to study different features of repairs through the medium of an inspector co-operating with shop superintendents. He determines whether material sent in for repairs should be or should not be repaired; if material is beyond repair, the outside point is advised and the order is cancelled, or possibly new material is supplied in its place.

On the Rock Island Where Conservation Activities are Well Organized

The report is signed by U. K. Hall (chairman), general supervisor of stores, Union Pacific; J. J. Bennett, purchasing agent, Illinois Central; E. B. DeVilbiss, assistant stores manager, Pennsylvania; E. S. Marsh, general storekeeper, Wheeling & Lake Erie; A. W. Munster, purchasing agent, Boston & Maine; J. G. Stuart, general storekeeper, Chicago, Burlington & Quincy; G. E. Scott (chairman ex-officio), purchasing agent, Missouri-Kansas-Texas.

Discussion

U. K. Hall (U. P.): This committee presents a new subject in which there were several methods of procedure that we could follow. After much discussion, we decided to follow the educational feature. We have showed what has been accomplished, with the idea of bringing before railroad managements that this is a subject for study.

H. H. Laughton (Southern): May I ask the gentleman if he requisitions material as is requested by the mechanical department if he has that material already on hand? Is not the store department responsible rather than the mechanical department, for the supply that is carried?

W. P. Beall (S. P.): The store department is not responsible in this way. It takes the requisition from the

mechanical department. The material is needed, but after they have received the material, ofttimes they find that the mechanical department has changed its mind and does not need that material for three additional months.

The Chairman: Does that answer your question?

Mr. Laughton: That answers the question, but it does not meet the condition on our line.

F. D. Reed (C. R. I. & P.): All of us are working on allowances. Sometimes they are not as big as they ought to be or should be. Every time we get a complete 100 cents out of a dollar of service we can in that way increase our labor. Labor and material both are taken into consideration in arriving at the amount of material we can spend each month. If we get 50 cents out of a dollar's worth of material, we are only permitted to employ that many less men. If we get a dollar's worth we can employ that many more men. We should all be humanitarian enough to try to employ all the men we can at this time.

On the Rock Island we have had what we call a General Reclamation Committee that has been in operation for five years. It is not in the sense what the name committee implies. The members of that committee are regular snoopers; they do everything. We have a general committee consisting of representatives for the purchasing, mechanical and the stores department. We have a division committee on each operating division, and the important terminals have local committees. They not only look after the material situation, but they look after everything that is of interest in the way of economy. If they put too much coal on the locomotive tenders, they take that up with the operating department officers. We do the same on tools. We follow it through to tie plates and everything in connection with maintenance of way. We are accomplishing results.

D. R. Elmore (Fruit Growers' Express): This is an excellent report. I would like to make one suggestion, and that is that, in reading it and considering it, the sentence immediately following the first, second and third paragraphs on the first page be somewhat minimized. It reads: "However, we feel that this is not within our province as our subject is 'promotion of conservation methods in use of materials,' on hand after they have been received; that is, the protecting, preserving and guarding of same." I think if we skip over that lightly and realize that we are also interested in developing the necessity for purchase of material, and are interested in seeing that the proper materials are purchased, and that they are purchased nearer the time of actual use, we will get even more out of the report. I think all of those functions are primary in the store department's activities.

Report on Stores Department Safety Work

Systematic organization recommended to get the best results in accident prevention———Methods explained

H. Weindel
Chairman

A study of the various classes of non-train accidents to railroad employees on duty, as reported by the Interstate Commerce Commission for years 1925 to 1928, inclusive, reveals a reduction of over 46 per cent in the three-year period. While the I. C. C. report includes non-train accidents to employees in all departments, it can be safely said that the Stores Department have done much to make this reduction in accidents possible.

However, we are still confronted with many avoidable accidents in connection with the handling of stores materials.

Of the various classes of accidents, the following contribute the largest number of casualties and these are still the classes of accidents in which the greatest reduction can be made:

A—Handling heavy material, such as rail, ties, bridge lumber, heavy castings, etc.

B—Collapse, and falling of objects.

C—Use of hand tools, apparatus, etc.

D—Falls of employees.

Safety Committees

On some railroads the Stores Department have recognized the need for and put into effect organized safety committees composed of Stores Department employees who meet regularly for the discussion of safety problems peculiar to the Stores Department operation.

Gratifying results have been experienced where Stores Department safety committees have been functioning. Special attention and consideration have been given to problems that are peculiar to the Stores Department.

Unsafe conditions have been detected and corrected before they resulted in an accident. Unsafe practices have given way to safe methods and practices. Efficiency of the workmen has been increased. Accidents and injuries have been decreased. A keener interest in safety matters has been displayed by the employees.

Such safety committees should be composed of a representative group of all classes of labor in the Stores Department, called The Stores Department Safety Committee, to work in conjunction with division or terminal safety committees. At the general store the personnel of the committee should include permanent members consisting of the local officer in charge of safety, district or division storekeeper, local storekeeper and general foreman or store foreman, and rotating members to be appointed for a designated period from the stockmen, gang leaders, helpers, motorized equipment operators, laborers, etc.

At small stores where the limited number of men employed would not justify an organized safety committee as outlined the local storekeeper should conduct safety meetings with his men at regular periods.

Meetings of the established committees should be held on the premises at least once a month during working hours, without loss of pay to committeemen.

The subjects of discussion should include a resume and discussion of accidents, or near accidents, occuring on the property since last meeting, unsafe practices, unsafe conditions, new safety rules and instructions, safety suggestions, and a general discussion on safety matters, etc.

Suitable printed forms should be used to record the minutes of the safety meeting, and a copy should be submitted to each member of the committee and visitors who were present.

A Derrick-Equipped Tractor on the Union Pacific—A Helpful Factor in Safety Work

REPORT OF SAFETY MEETING

Name of Committee_____
Location of Meeting_____
Date of Meeting_____ 193____
Hour Convened_____ Hour Adjourned_____ Hours in Session_____
Time Devoted to Inspecting by Committee_____ Hours

MEMBERS OF COMMITTEE
(Show absentees by X before the name—See note below)

Mark X If Absent	NAME	OCCUPATION	LOCATION

NOTE—Above list should contain only complete personal of actual appointed committee members. Visitors present at meeting as well as other information should be shown on Sheet B. See instruction note on top of same.

Ex. A—Recommended Form for Reporting a Safety Meeting

Printed forms which have been found practical for this purpose are described as follows:

Exhibit A, Sheet A should contain the complete personnel or actual appointed committee members, showing name, occupation and location.

Exhibit B, Sheet B gives (1) Names of visitors present and occupation of each. (2) Letters and communications. (3) Accidents discussed. (4) Talks by visitors or members. (5) Papers read on any specific subject.

Additional sheets should be marked sheet "C," etc.

Exhibit C should contain the new recommendations submitted and name of employee offering it and the action taken at the current meeting.

Safety Committeeman

Each member should understand that his appointment is an important one and that as a safety committeeman he should earnestly and conscientiously study the principles of safety, thereby broadening his knowledge of the causes and corrective measures for the elimination of accidents and injuries. He should be impressed with the fact that by his efforts in this work he not only develops his own efficiency as a safe workman but influences others to work in a safe manner.

Members should be encouraged to study the safety of the physical condition of yards, buildings, tools, equipment, and sanitation with which they come in contact in their daily tour of duties, and to promptly handle for correction any unsafe condition at once.

At the meetings each member should relate his safety activities since the previous meeting for the information of other members.

All employees, whether members of the safety committee or not, should be encouraged to offer safety suggestions. These can be submitted verbally to the foreman or storekeeper, offered at the safety meeting in person, or through the medium of a safety suggestion card which should be available for employees.

Suggestions offered should be discussed as to their merits. If the suggestion can be taken care of within the authority of the local committee, the suggestion should be disposed of promptly. Otherwise it should be referred with the local committee's recommendation to higher authority for further action. Every suggestion offered should be kept pending in the minutes of the meeting as "Unfinished Business" until final action has been taken.

At each meeting the chairman shall state the progress on pending suggestions, also final action taken on all suggestions disposed of. If the suggestion, after due consideration, is found to have no merit, the employee who offered should be given the reason and he should be thanked for his efforts and encouraged to offer further suggestions which he believes should be considered by the committee in the cause of safety.

Disciplinary action should not be taken on the basis of information divulged by employees where fellow employees names are connected with irregularities mentioned when taking part in these discussions. Employees offering such suggestions must be made to feel that the information is used only for the purpose of correcting unsafe practices before they result in an injury or accident.

SAFETY COMMITTEE MEETING—Continued

Name of Committee_____ Month_____ 19____

NOTE—Please enter below: (1) Visitors present and occupation of each. (2) Letters and communications; give short reference such as date, from whom and subject. (3) Accidents discussed; give brief reference to each. (4) Talks by visitors or members in interest of Safety First; give name and subject. (5) Papers read on any specific subject; state name, etc. If additional sheets needed, substitute same and mark Sheet C, etc.

We Certify that report on Sheets A, B,_____ also report on supplementary Sheets No._____ to No._____, inclusive, and attached hereto is a correct account of the proceedings of the committee at its meeting above mentioned.

Approved:

Chairman of Committee Secretary of Committee

Ex. B—Form for Reporting Minutes of a Safety Meeting

Recommendations for Safe Practices

The supervisor, in considering the work which he is to do, should carefully consider the number of men he can work to advantage to get his work done economically, quickly and safely. He should use only a sufficient number of men to do the work. He should employ safe men as far as possible and instruct them carefully along safe lines, concentrating particularly on the new men he employs day by day. The supervisor himself should keep on the alert, watch and correct all hazards or conditions which might result in accidents.

Tools, material and equipment which the men are to use should be inspected carefully before and during the work to make sure they are in proper condition and all defective ones immediately replaced or repaired.

Operations of Cranes and Hoists

Crane and hoist operators should be held responsible to avoid injury to men about the machine and are responsible for seeing that all parts are in safe working condition. They should report any wear or developing defect in time to secure repairs or replacement, and should stop operations when any unsafe condition is found.

The crane foreman should actively supervise every move being made. He should call all instructions and should take ample time to assure that every man is in position and ready before calling a move.

Loading Rails in Cars

Rails should not be dropped into cars promiscuously, except when it is known they can be unloaded by magnet at destination. Rails placed in cars for hand unloading at destination should be carefully piled in tiers, either all upright or alternate rails inverted. Slats or strips of uniform thickness should be placed between each tier. Time spent properly tiering is justified by increased safety and speed in unloading.

Supplementary Sheet No._____

Safety Committee_____

8-29-150,000-U

Number of Recommendation	NAME OF EMPLOYEE AND THE NEW RECOMMENDATION MADE BY HIM SHOULD BE STATED DEFINITELY (Items Carried Over Need Not Mention Name, and Give only Short Reference to Its Title—Be Brief but Explicit)	ACTION TAKEN AT CURRENT MEETING (State Definitely and Briefly)	GIVE ITEM NUMBERS IN THESE COLUMNS			
			Corrected	Open for Further Consideration	No Action	Referred to Division or General Committee

Ex. C—Form for Reporting Action on Safety Suggestions

Tractor and Truck Rules

1. An operator should be permanently assigned to a vehicle and responsible for its proper care and its equipment.

2. He should be carefully instructed regarding the rules and regulations affecting the operation of his vehicle, particularly those pertaining to the authorized speeds and carrying capacity. He should be instructed in general traffic rules and the local traffic regulations of the city and state where he is located.

3. When loading, no part of the load should extend beyond the side clearance limits of the vehicle.

4. If part of the load extends beyond the rear end of vehicle, a bright red flag in daytime and a red light at night should be attached to extreme end of projecting load.

5. Non-skid chains should be part of the vehicle's equipment and should be ready at all times for use when necessary. When non-skid chains are necessary, they should be installed on both rear wheels. One chain only may result in a serious accident.

6. Brakes should be tested daily. If the brakes do not operate satisfactorily they should be adjusted.

7. Drivers should determine how the brakes respond when driving on different kinds of roads under different weather conditions, and be governed accordingly.

8. Drivers should not attempt to carry on a conversation with others in the vehicle while operating said vehicle.

The report is signed by H. Weindel (chairman), inspector stores, Union Pacific; E. J. Clark, chief lumber inspector,

Chicago, Burlington & Quincy; E. H. Lyons, division storekeeper, Chicago, Milwaukee, St. Paul & Pacific; F. A. Murray, district storekeeper, Baltimore & Ohio.

Discussion

H. Weindel (U. P.): In referring to the recommendations and suggestions of past committee reports, we found some difficulty in the duplication of suggestions. For that reason, we would like to recommend that the committee suggest that the 1931 Committee on Subject 17, Stores Department Safety Practices, classify the various stores department operations so that the recommended safety practices of past committees, as well as future recommendations, may be tabulated under a specific symbol reference pertaining to the appropriate operation.

Classifying all these recommendations under a specific symbol so that they can be referred to will be a great help. All of the recommendations that have been made in the past or in the future will be under some specific symbol and be easily referred to.

It is difficult to have a complete report without interferring with other departments. However, this Division has felt that we should go into safety whether we stepped on anybody's toes or not. Are we on the right road to safety?

E. W. Peterson (Bangor & Aroostook): Under the heading of Supervision, the committee has clearly shown the responsibility of the supervisor, and it is so handled on our railroad. The last sentence is of particular interest. I would like to ask the committee if they would care to recommend what discipline would be most effective to men who show lack of effort to do their work?

Mr. Weindel: I do not believe it would be the right policy to set up any definite discipline for lack of effort. It depends entirely upon the merits of the case. Often a man may be in a position for which he is not rightly fitted. By changing his work, you bring out something from him that you did not recognize before.

Mr. Reed: There is nothing we can do that is more important to our workman than to avoid accidents.

There being no further discussion the report was accepted as read.

Report on Manufacturing in Railroad Shops

Problems of organization and stock control explained and cost finding methods described in committees study

H. D. Foster
Chairman

This committee has investigated the subject from the following viewpoints:

1. *Even production of shop manufactured material to meet requirements.*
2. *Centralization of manufacture of material.*
3. *Obtaining accurate costs.*

It is desirable from every viewpoint to have a well balanced productive force on manufacturing of materials.

Outside manufacturing concerns, to a large extent, regulate their forces with the supply and demand for material. During lean periods they reduce forces to the minimum consistent with the current requirements and maintenance of the necessary reserve stock for anticipated requirements.

Stabilizing Production

To some railroads a similar arrangement seems to be the best method of obtaining the results desired. Other railroads argue against it. One reason often cited is that, due to the distance of the shops from industrial centers, etc., the men cannot be absorbed in other lines of work locally, and if laid off, they move to other localities where they think they will be able to obtain steadier employment. This would make it impossible for the railroad to obtain men when necessary to readjust their forces upward to take care of peak requirements, and that this would cause costly delays, hinder output and increase the cost of manufacturing materials. In order to prevent a condition of this kind, such roads are making an attempt to schedule orders for manufacturing materials, by setting up a definite quantity of each item to be manufactured monthly. This material is piled up during low periods of consumption to take care of the requirements during peak consumption.

It does not appear possible to regulate the placing of orders with the shops to take care of actual current requirements over a given period and avoid building up an excess stock, and at the same time maintain an even productive force throughout the shop.

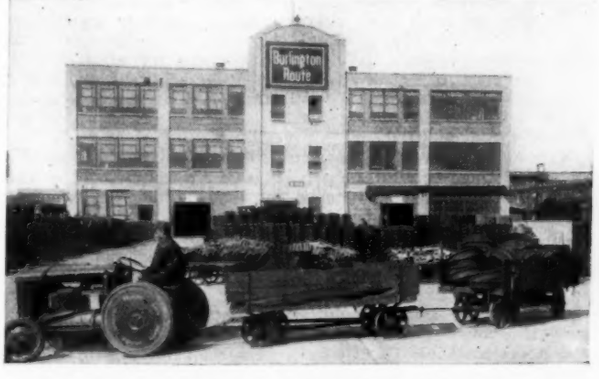
To provide a force even to take care of actual current requirements is difficult because various demands occur that disrupt the manufacturing organization.

Many items of material are maintained for emergency requirements on which calls are made which wipe out the protective stock and on which further demands are made for like material before the protective stock can be replenished. If the shop force is sufficiently large to take care of normal current requirements and to protect against all emergency orders, it is then either an unbalanced force during certain periods, or it becomes necessary to place advance orders for materials without definite assurance as to just when it will be used.

Due to the fact that the railroad's requirements for certain classes of material are uncertain, the attempt to order a definite quantity of materials each month, will burden the stock unnecessarily far in advance of the time it is required. This piling up of material produces an extra cost of handling as well as an increase in the investment to the extent of the labor involved. If the attempt is made to distribute the material as manufactured to avoid handling at the point of manufacture, the road will quite frequently find that it has material at some outlying point that could be used more advantageously at some other point and on which there will be an additional handling expense as well as hauling expense. Some railroads, in attempting to keep an even productive force in the shop for manufacturing material, find it necessary to place orders on the shop from time to time with the view only of keeping the shop forces occupied. This appears to work out well from a shop standpoint, but makes an unfavorable showing on the stock balance.

Centralizing Operations

Centralization of manufacture of material at one or a few shop points is a step that a number of railroads have already taken with very gratifying results. The advantages to be gained



A Concentration Point for Shop Made Material on the Burlington

through the centralization of the manufacturing at one point are many. It permits of a reduction in stocks of raw material at the non-manufacturing points with a reduction in investment. Under the plan of centralizing we would eliminate various duplicate stocks and carry the finished article at one point for protection to the entire system.

Centralization permits a reduction in investment of machinery as well as a reduction in maintenance cost of machinery. It allows for the purchasing of more modern machinery with a result that the manufacturing costs are lowered, as it is quite obvious we can justify the expenditure needed for machinery when we know it will be busy continuously, and on which production costs can be reduced sufficiently to justify this expenditure.

Centralizing the manufacturing of material at one shop insures the maintenance of standards and permits a closer check or inspection of material.

By the centralization of the manufacturing at one shop we would obtain quantities on one order for one machine set up that would perhaps represent several machine set-ups if each shop point was manufacturing for its own needs. The advantages to be gained would not only be saving in machine set-ups, but the improvements to be made through quantity production would permit the rigging up of necessary jigs, tools, etc., that would not be warranted for a few pieces as would be the case if each shop was manufacturing. Centralizing manufacturing permits assigning men to certain classes of work almost continuously, resulting in their becoming specialists on this class of work.

The shop chosen to take care of manufacturing for the system should be divorced from the repairing, building, or rebuilding of cars or locomotives, and its efforts confined entirely to the manufacturing of material. Locomotive or car repair shops are interested primarily in the output of locomotives or cars. It is possible where a locomotive or car shop is manufacturing material that incorrect labor charges may be made to store orders when the correct charge should be made to locomotive or car repairs. The opposite is also true. Where the efforts of one shop are confined entirely to the manufacturing of material on stores orders, it is possible for labor to be charged only against stores orders. This would result in getting nearer to the true cost of the material made.

The manufacturing shop should be as near to the source of supply of raw material as possible so as to eliminate any back hauling of the finished material for distribution. Where possible, the manufacturing shop should be at the point where the main store is located and where the scrap dock is located, so as to eliminate any unnecessary handling of raw material from stores to shop or from the scrap dock to the shops when scrap is used in manufacturing. Having the manufacturing shop at the main store point would afford better distribution, as the general practice is to load through carloads to the outlying stores and repair track points. By having material manufactured at the various shops it is not possible to distribute in direct carloads, which makes it necessary for considerable lcl shipments handled through stores and freight houses at increased costs.

Obtaining Accurate Costs

In order to have proper control of manufactured material and to obtain true costs of manufacturing, material should be ordered through the medium of a stores order on the shop.

All sub-orders between foremen in various mechanical departments to cover the making of miscellaneous material from time to time for their own needs must be eliminated. Unless these sub-orders are eliminated we are apt to have material made up on a foreman's sub-order where there is already a surplus either at the local store or some other store point on the line. By having all orders go through the store an index will be furnished as to the quantity of material actually being manufactured and the data obtained will permit the stores placing orders for larger quantities of material with the consequent reduction in cost of manufacture through the spreading of overhead expense, machine set-ups, etc.

The preparation of stores orders for material to be manufactured in the shops must be given the same consideration as would be given an order placed with the purchasing department. The following factors must be considered:

A. The economical quantity to be covered on store orders for one set-up of machinery.
B. The number of days required by shop to complete delivery.
C. The average yearly or monthly consumption.
D. The number of stores orders for any one item to be placed throughout the year based on items A and C.
E. The effect of the above method of ordering stock on the material stock balance.

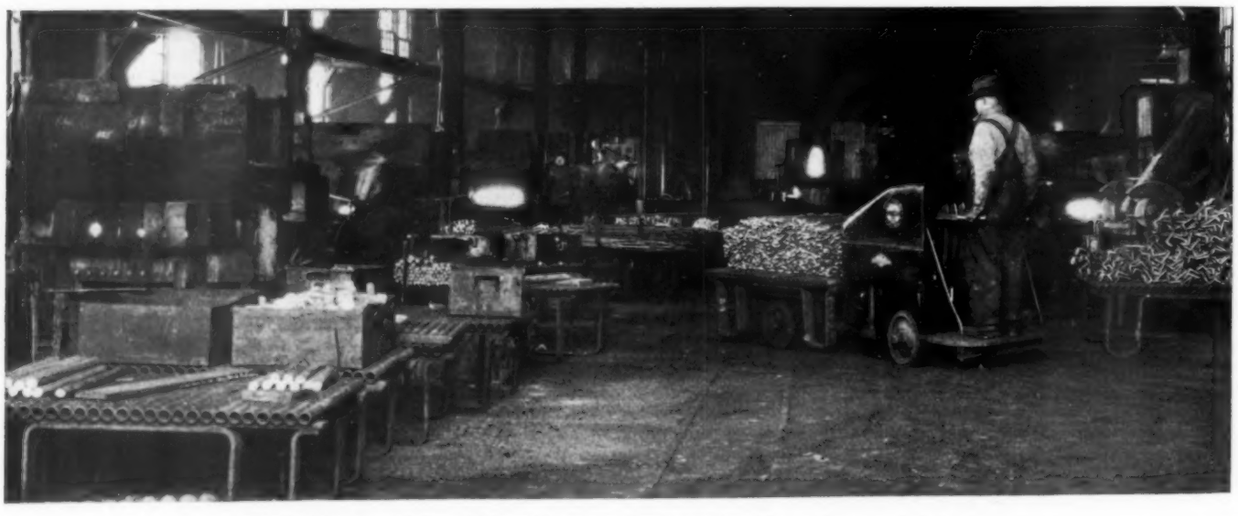
In order to determine whether it is profitable to manufacture material rather than to purchase it a system must be set-up to produce the necessary data as to the cost of manufacture.

Before determining to manufacture any material not previously manufactured, the shop should work up a very close estimate as to what its costs will be for manufacturing the material. The shops should bid on the material the same as the manufacturer will bid, this estimate to include in addition to the direct material and labor charges, a consideration of the waste of material, etc., the cost of tooling up for the job, engineering costs on prints, sketches, patterns, dies, jigs, etc. The cost of all dies, jigs, tools, etc., should be pro-rated over the estimated quantity that would be required for the particular work. The cost of machinery set-ups should be also included in the estimate.

In determining whether a road should continue to manufacture an item or discontinue manufacturing it should have all cost data at hand so that a comparison can be made. A number of railroads have developed methods for obtaining such costs. One method is as follows:

A Method of Cost Finding

First, the store department makes a store order on the shop and at one writing makes sufficient copies for the various departments interested including the shop accountant or cost accountant. The order is then checked against the master stock



Shop Work on Stores Material on the Southern Pacific at Sacramento, Cal.

book, surplus lists, or other similar records, and when approved is forwarded to the shop superintendent at the manufacturing point with all copies necessary for that department's use.

Second, the mechanical department with this order and the card records in its office covering detailed bills of material required for the job, orders the required raw material from which to manufacture, and charges it against the individual stores order. Such requisitions are forwarded to the store department in the regular way, but the material is not delivered to the shops until the shops are ready for it. The store department delivers the material direct to the machine where the first operation is performed.

Third, the cost accountant upon receiving his copy of the order prepares a card record if this is the first order for the material received. On the copy of the order received the cost accountant accumulates detailed information as to the direct labor charges and material charges by months, by the departments, and applies to this a store per cent for handling material during the current month, and shop overhead expense by months. This information is drawn off from requisitions and from daily time check tickets which are checked against job tickets and the total is compared by units with the card record of the previous orders.

An investigation is immediately made by the cost accountant if there is any difference per unit either for material or labor charge on the order when compared with previous orders as shown on the card record or loose leaf record, and if found to be correct, a report is made to the stores department as to the cost of the material manufactured. Any discrepancies in labor and material charges are investigated and adjusted.

In comparing these costs with the cost of the purchased article in addition to the direct labor, material, store expense and shop expense, an additional per cent covering the actual overhead expense for the previous year is added and decision made as to whether it is more profitable to purchase than to manufacture.

The copy of the order in the cost accountant's office carries all cross references to the supporting data shown on job tickets, daily time slips, etc., covering the work.

Fourth, the cost accountant has a man in each of the respective shops known as a job checker. The first of every month a number of job tickets are numbered ahead consecutively starting with No. 1, and distributed to the various job checkers. These men are under the direct supervision of the cost accountant and divorced from the supervision of the local mechanical forces. They check the work being performed by each operator in their department continuously throughout the day. One job ticket with supplements is used for each stores order on which work is being performed and there may be more than one job ticket for a stores order, if the work is being performed in more than one department at the same time.

On these job tickets is shown the stores order number, name of workman, class of work being performed, quantity, mens' rate of pay, starting and stopping time on each stores order with the actual time shown performed on the work including machine set-ups, break downs, preparation of tools, etc., the amount of time allowed, if on a bonus system, or money allowed, if on piece work.

These job tickets are held by the job checkers until the work is completed and all expenses incidental to the particular order are recorded thereon which will include the labor assemblying, testing, inspecting, etc.

Fifth, the inspection of the material in the process of manufacture is under the supervision of the mechanical department. All direct labor for such inspection, etc., is charged direct to the individual job. Inspection made by the testing department, which is just as rigid as the inspection given to purchased material, is prorated over the general material account and cleared through store expense which is the same as if the material was inspected at the manufacturing plant where the charge would be prorated in a similar manner.

After the costs are obtained and compared with manufacturing costs, the decision is then made as to whether the manufacture of the article by the railroad shall continue. The piece work inspectors are supposed to have previously made investigation as to improvements to be made, reduction in costs to be made, etc. The Cost Departments are continuously making investigations in manufacturing plants, other roads, etc., obtaining information whereby improvements can be made throughout the shop towards reducing the cost.

The report is signed by H. D. Foster (chairman), cost accounting engineer, Chicago, Burlington & Quincy; H. P. Akin, district storekeeper, Canadian National; A. W. Blume, general storekeeper, St. Louis-San Francisco; O. V. Daniels, works storekeeper, Pennsylvania; C. H. Dayton, division storekeeper, Michigan Central; P. E. W. Goodwin, Jr., storekeeper, Fruit Growers' Express; H. M. Smith, assistant general storekeeper, Northern Pacific; H. Shoemaker, division storekeeper, Baltimore & Ohio; J. U. King (chairman ex-officio), general storekeeper, Atlantic Coast Line.

Discussion

H. D. Foster (C. B. & Q.): Our report contains in some instances a combination of methods that are in effect on railroads as well as in effect with manufacturing concerns. It is in brief that all departments are now interested in the even production of manufacturing.

There is some doubt as to how this best can be obtained. There is a difference among the members of the committee as to the best recommendation to be made as to how even production can be obtained. Some roads are adjusting their forces to meet the conditions as the supply and demand requires, while other roads are setting up what they consider a well balanced organization and are then keeping the shop supplied with orders to take care of the needs as they arise. This latter method seems to have a detrimental effect on the stock balance. The idea of just keeping the shop forces engaged is not good from a material-balance standpoint. We favor the adjustment of the forces to take care of the conditions as they change, and recommend that, where possible items be covered on a budgeting plan of so many pieces required per month. You will have to adjust the forces to meet the conditions as they arise. The best good can be obtained through centralization of manufacturing.

J. G. Warnecke, (I. C.): Changes in manufacturing occur so often that you have to be careful. Some people are usually over-anxious to manufacture in large quantities on account of the decreased cost of manufacturing of such and you must watch that carefully.

D. R. Elmore, (Fruit Growers' Express): Too much emphasis cannot be laid upon the matter of keeping accurate costs for manufacturing, because even though you may be equipped with the necessary machinery and facilities, there are times, particularly during depression periods such as we have now, when you can buy articles cheaper than you can make them. Of course, that is the thing to do under those circumstances.

J. C. Kirk, (C. R. I. & P.): We all know that we ought to watch our costs very carefully and compare them with what the manufacturers can make the material for and not manufacture any material that we can buy cheaper outside. Our policy is to buy material, provided we can get it at an equal figure to what we can manufacture it for. The reason is that our shops were organized more for repair purposes, so if we can buy at all favorably, our policy has been to purchase outside.

Mr. Laughton: Our policy is different from that of Mr. Kirk. We try to manufacture everything cheaper than we can buy it and when the manufacturing cost gets anywhere near what we can buy it on the outside, we go to the crafts and say, "Now here, our purchasing department can buy this for a certain price. You have to increase your production, or we will buy it on the outside." We prefer to keep the shops going in the manufacturing of material, because it keeps our employees at work. We frequently have a number of cases where we find, for instance, in our frog shop, that we get competitive bids at a little lower than we are making them. Then we say, "well, instead of turning out forty-eight, you have to turn out fifty-two, or we will close the shop." We get the fifty-two.

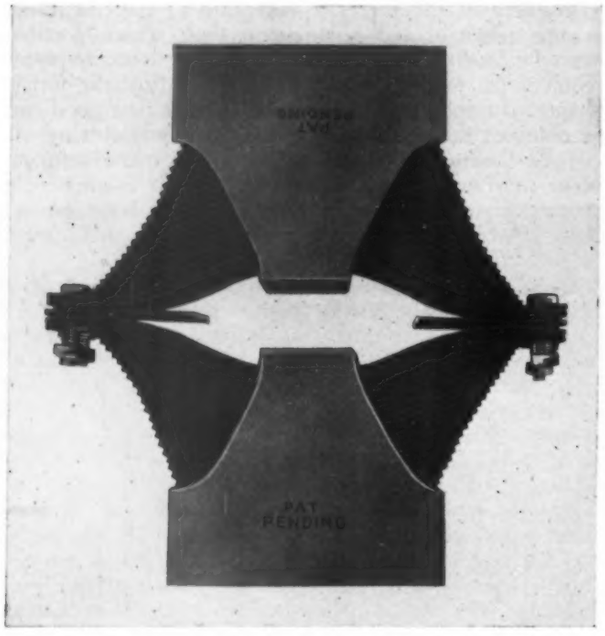
H. M. Dewart, (C. V.): When making a comparison of our costs as against what we can buy those same materials for, an allowance should be made for the overhead which exists whether or not you perform that operation in your own shop. The chairman has clearly brought out that point; such items as insurance, heating, etc., probably exist regardless of whether you purchase or make your own.

On motion regularly made and seconded, it was voted to accept the report.

New Devices

The Goodwin Leaf Friction Draft Gear

ELLIPTIC-SPRING leaf draft gears, designated as the Super-Gear Goodwin leaf friction draft gears, are being exhibited by the Standard Coupler Company, New York. Two full sized gears, the Super-Gear type A and type B, are being shown. The Super-Gear type A has a pocket length of 24⅝ in., a yoke width of 9⅛ in., a travel of 2¾ in., and a capacity of 18,000 ft. lb. It weighs 675 lb. and has a fraction area of 100 sq. ft. The type B gear is of 29⅛ in. pocket length and is designed for use on heavy equipment such as large locomotive tenders and 120-ton cars. This gear has a yoke width of 9⅛ in., a travel of 2¾ in., a friction area of 130 sq. ft., a capacity of 24,000 ft. lb., and weighs 825 lb.

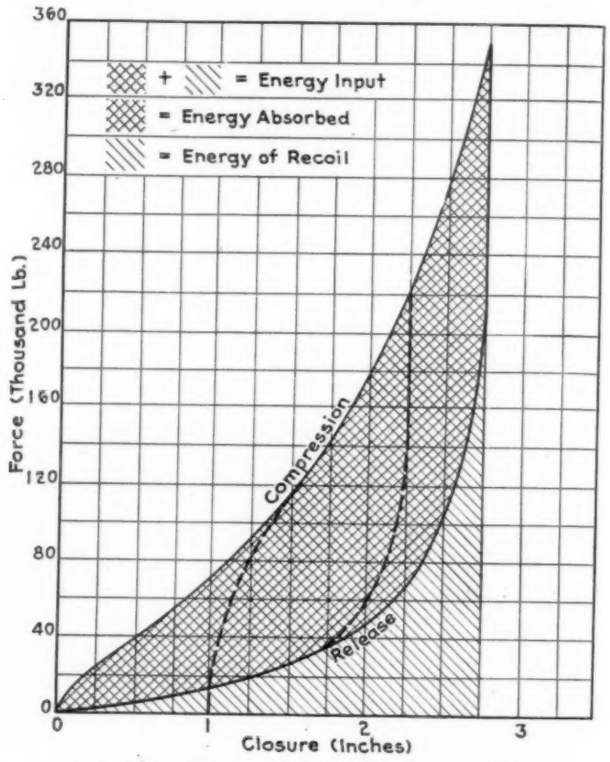


The Type A Super-Gear

Both the A and B gears are of elliptic-spring leaf type of high capacity, with over 60 per cent absorption and have a column strength of 36 sq. ft. The force-closure curve illustrates the capacity of the type A gears.

Should a few leaves of either gear become broken from any cause whatever, the parts are held in place, partly so as not to put any undue strain on the other leaves and partly because they will continue to function. The leaves have a certain spring value independently and to their combined capacity friction is added on compression and subtracted on the recoil. The great number of leaves makes the friction value considerable.

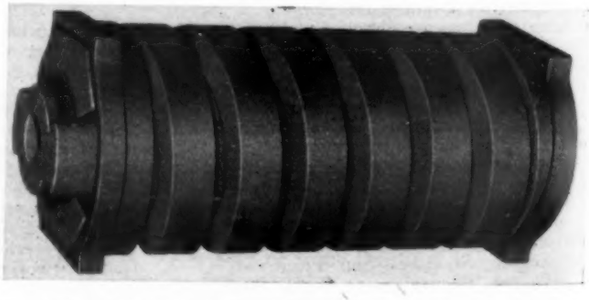
To prevent frequent over-solid blows and corresponding shock to car and lading as far as possible the spring is designed to offer gradually increasing resistance per unit of travel and, by the resulting high ultimate capacity, to eliminate over-solid blows except at excessive striking speeds.



The Force-Closure Curve of the Type A Gear

Cardwell Spring-Barrel Friction Draft Gear

THE Cardwell Westinghouse Company, Chicago, is exhibiting a spring-barrel friction draft gear of all-steel construction. It is designed to overcome



The Cardwell Spring-Barrel Friction Draft Gear

such difficulties as split barrels, barrels upset from over-solid blows, barrels worn out by action of the friction parts and uneven closing resistance resulting from high wedging pressures on small areas.

The wedge, wedge shoe, outer shoe and both spring seats are held in place by a single bolt. The friction parts are all hardened chrome steel and the center-post is of heat-treated alloy steel.

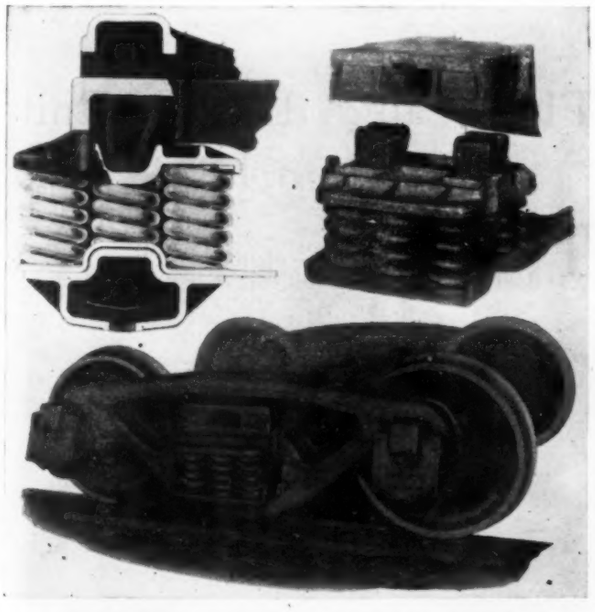
The gear design permits a comparatively large frictional area through the use of a heavy steel rectangular spring as a barrel. The barrel has a certain flexibility to permit an even loading on the friction surfaces. The friction area allows comparatively low wedging pressures to be used.

Over-solid blows are carried by a hardened alloy-steel center-post and not on the barrel. The initial resistance of the gear is comparatively low on account of the free coils extending beyond the outside friction shoes. The gear is designed to be applied with any standard A. R. A. draft attachments.

Lateral Motion Device for Trucks

THE Symington Company, Rochester, New York, is exhibiting a complete truck in which is incorporated provision for gravity control of transverse bolster forces. The side frames are of standard Symington double-truss design, the lateral motion device affecting only the bolster and the spring caps. The H-shaped spring grouping is maintained and the rectangular spaces between the arms of the H permit the cast spring cap to be pocketed to hold rockers or tumblers, the upper ends of which rest in inverted pockets in the ends of the bolster.

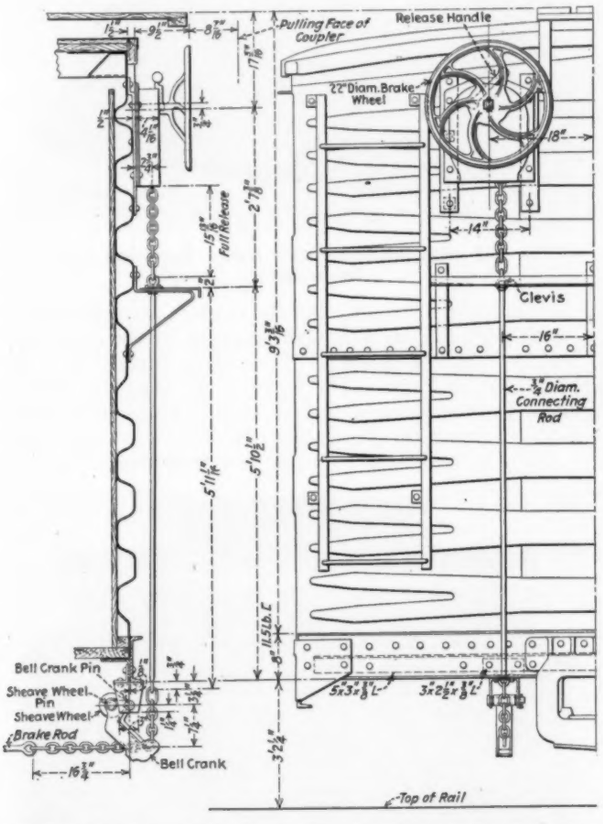
In the operation of this device the contour of the rockers elevates only the outer end of the bolster under lateral thrust, the inner end moving transversely without change in elevation. The truck is provided with a recording device which traces on a small chart the movement of the bolster under a lateral force.



A Cross-sectional View of the Lateral-Motion Device—The Partial Assembly Shows the Construction and Position of Rockers together with Details of Spring Cap—The Truck Assembly

The Ureco Hand Brake with Vertical Wheel

THE Union Railway Equipment Company, Chicago, is exhibiting an improved Type BA vertical-wheel hand brake. This brake is of the one-hand type and can be set up or released with one hand only, leaving one hand and both feet of the brakeman free. The upper unit is enclosed in a pressed-steel housing



An Application of the Ureco Vertical-Wheel Hand Brake

with stiffening corrugations to insure against distortion, warping, etc. The gearing is designed with a 6¼ to 1 ration, the pitch diameter of the gear and the pinion being 12½ in. and 2 in., respectively. The brake is released by tripping a pawl-release mechanism.

A feature of the brake is the bell crank at end sill for transition of the pull or force from vertical to horizontal. The bell-crank sheave is designed as an unlimited bell crank to eliminate the continual adjustment of slack chain to make this bell crank sheave and hand brake operative. The slack chain is taken up on the sheave as soon as the chain becomes taut. After the bell crank has completed its full travel through the arc in which the leverage obtained therefrom is useful, the device ceases to function as a bell crank and acts as an ordinary sheave wheel which is unlimited as to chain travel.

A Journal-Box Lid with an Inner Seal

THE Chicago-Cleveland Car Roofing Company, Chicago, has developed and has on exhibit a journal-box lid with an inner seal which is made of spring steel so as not to take a permanent set. An oil ring is

The Lid with a Corner Cut Away Exposing the Inner Seal

pressed into the inner seal and the corners are split to allow each edge to conform to the contour of the box face to which it makes contact. The lid is furnished with integral hanger loops. The loops form elongated holes to allow for the wear of the pin hole in the journal box without affecting the bearing of the lid. The loops are also designed with lugs to retain headless pin. Another

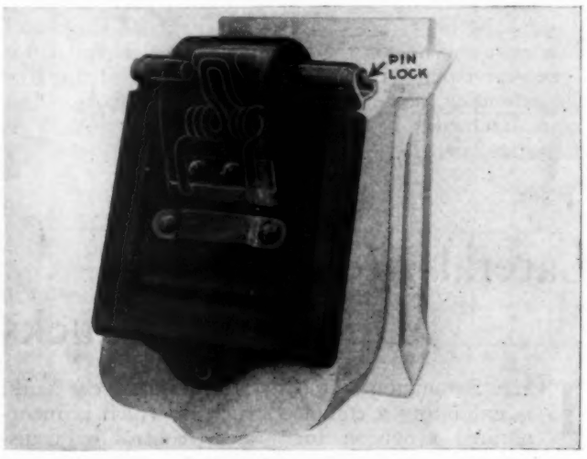
The Inner Seal, Showing the Split Corners and the Oil Ring

feature is a spring housing which transfers the full force of a cantilever spring to the center of the lid to insure equal pressure to all edges of the inner seal. The spring housing is also designed with an extension for use in opening and closing the lid.

Davis Journal-Box Lid

A CENTER-BEARING torsion-spring type journal-box lid, which meets the latest A. R. A. specifications set forth in circular D. V. 657, is being exhibited by the Davis Brake Beam Company, Johnstown, Pa. The main portion of the lid covers the opening of the box and provides continuous contact with the face of box on all four sides. It has top, side and bottom flanges to further prevent the entrance of dust and dirt.

A detachable hood houses the lug of the box and

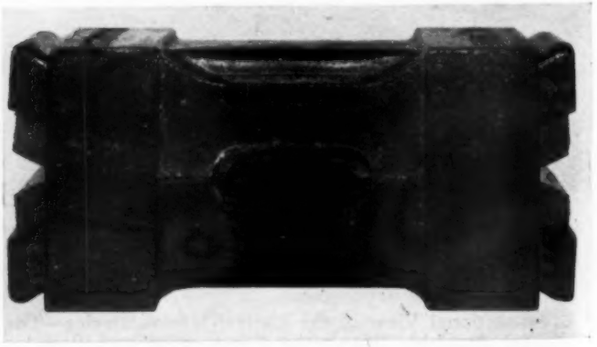


The Davis Center-Bearing Torsion-Spring Journal-Box Lid

spring mechanism which consists of an oil-tempered coil spring which exerts pressure at the center of the lid. The hood leaves the lid proper free to adjust itself to the face of the box. The strap over the end of the hood permits the lid to function as a single unit when opening or closing. It is hinged to the box by means of a headless pin retained by a pin lock at the end of the hinge scrolls.

The Waugh Double-End Friction Draft Gear

THE Waugh Equipment Company, Depew, N. Y., has on exhibit the Waugh-Gould type DE-600 double-end friction draft gear which is designed



The Waugh-Gold DE-600 Friction Draft Gear

for use only with Farlow attachments. It is designed to be double-acting in operation, having 2-in. travel in draft and 4-in. travel in buff with corresponding relative capacities under impact loads. The gear consists of a housing in which eight coil springs are set against two follower plates. Two wedges at each end of the gear, held in position in the housing by means of two sets of 10 leaf springs, transmit the load to the coil springs. The housing is 25⅜ in. long, the wedges extending 2 in. beyond each end, permitting a 4-in. travel in buff. The complete assembly is 29⅜ in. long, 13½ in. wide and is fitted with a 1⅝-in. by 6⅛-in. hole for a retaining key.

The gear during tests showed a 9,000 lb. drop capacity and a slow speed capacity of 500,000 lb. in buff and 400,000 lb. in draft. It showed 85 per cent absorption under impact and also under slow speed.

Dirt Collectors with Improved Drainage

THE Westinghouse Air Brake Company, Wilmerding, Pa., has included in its exhibit two dirt collectors in which are embodied improved means for draining. The method heretofore used has been to attach a standard drain cock to the bottom of the dirt chamber. One of the new designs has the drain cock embodied as an integral part of the dirt chamber; the other has a hinged drain valve embodied in the dirt chamber. The latter type is illustrated.

With the latter design there is a rubber seated valve held closed by a tension spring, one end of which is attached to an operating lever, and the other end secured to lugs on the dirt-chamber body. When the lever is manually operated against spring pressure the valve is unseated and any accumulated moisture is free to drain out. When the lever is not moved to its full travel, spring pressure will close the valve when the manual pressure is removed. However, should the lever be moved to its full travel the spring will hold the valve open until manually released.

This Type of Dirt Collector Has a Hinged Drain Valve in the Dirt Chamber

Ajax Cast-Steel Doors

THE Union Metal Products Company, Chicago, has in its exhibit a non-corrosive and strongly designed cast-steel door for drop-door cars. The distribution of metal in the doors is made with exactness, hinge lugs and reinforcements are cast integral with the door and many riveted joints, rivets and forgings are eliminated.

An Application of the Ajax Cast-Steel Doors

The doors are designed to resist large impact loads and, should they become deformed, they can be straightened or welded without additional work, such as the removal of hinges, battens, etc.

A Pinch Bar with Saw-Tooth Grips

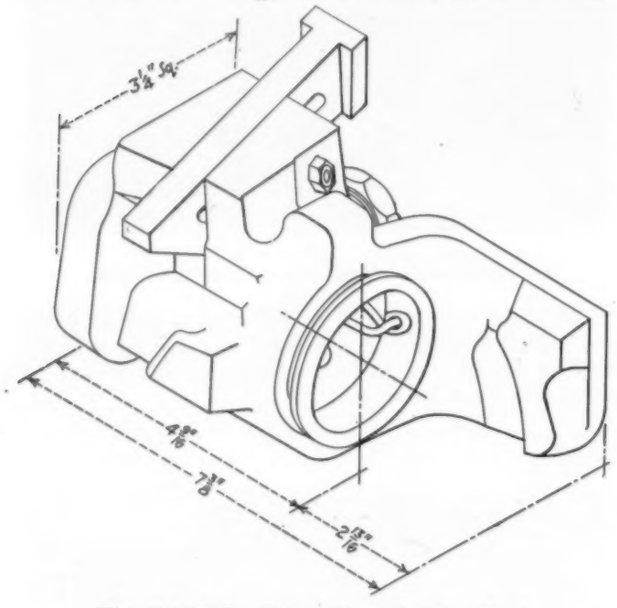
THE illustration shows the Smith pinch and jumping bar which is being exhibited by the Clark Manufacturing Company, 110 Turner street, Philadelphia, Pa. The bar is designed to be skid-proof,

The Smith Pinch and Jumping Bar Equipped with Saw-Tooth Grips

having a saw-tooth edge and a footing on a saw-tooth plate which pivots on a ball. The combination of bar and plate is so constructed that each locates itself with a full bearing on both the wheel and the rail even though either the wheel or the rail, or both, may be worn at an angle. The handle of the bar is a 5-ft. section of steel tubing while the plate and grip are made of hardened and drawn steel.

Steam-Hose Coupler Head

THE 2-in. steam-hose coupler head shown in the drawing is included in the exhibits of the Gold Car Heating & Lighting Company, Brooklyn, N. Y., and is designated by that company as the No. 825-S coupler. It is designed with a positive wedge



The Gold 2-In. Steam-Hose Coupler Head

block which holds the couplers together when under heavy steam pressure on metallic connectors. It also has an oscillating brass gasket which permits easy coupling and is furnished with a gravity trap which drains condensation from the joints when the steam is turned off.

A. C. F. Bucket Type Seat

A 47-INCH revolving bucket-type day-coach seat is being exhibited at Booth 221 by the American Car and Foundry Company, New York. This seat tilts at an angle of 22 deg. and is furnished with coil-spring hair cushions 21 in. wide and 18 in. deep. It is designed to revolve completely, but in its normal position it is locked against revolving, tilting or movement from the wall. A foot pedal, controlling the seat releasing mechanism, is placed so that it can be easily reached and operated by a slight pressure of the foot. The seat-controlling mechanism, the locking features of which are automatic, is located in the one-piece pressed-steel seat pedestal which is so designed that it can be

The A. C. F. 47-in. Revolving Bucket-Type Day-Coach Seat

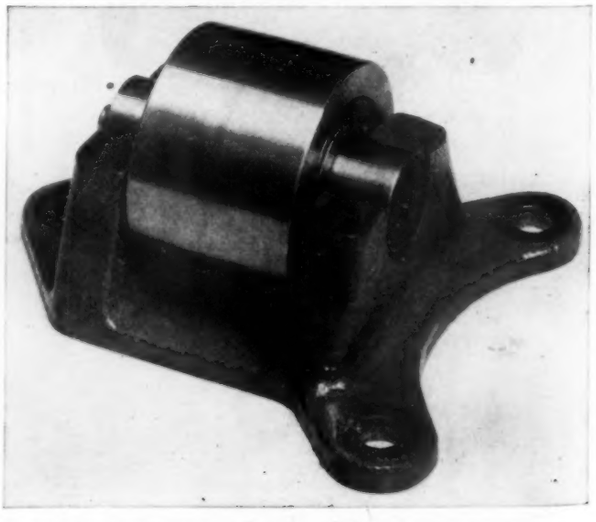
applied to old cars with the high seat plank or new cars with special steam pipes and lower seat plank. The seat is upholstered in blue-tone velvet mohair.

The seating arrangement in cars in which these seats are used is unique in that double seats are placed on one side of the car and single seats on the other side.

The design of the seat is such that it may be reversed by trainmen in the manner employed on the usual type of revolving seat by starting from the head end of the car and reversing in sequence. For individual revolution a revolving tilting movement is necessary to clear the back of the adjacent seat.

Roller-Bearing Side Bearings

THE roller-bearing side bearing shown in the illustration lends itself to the standard form of mounting on the truck bolster. The roller wheel



The Messinger Roller-Bearing Side Bearing

which is a roller bearing, yields frictionless motion and remains in a fixed position in its cage. Irrespective of the amount or direction of rotation of the truck, it is always in a correct position to afford free rolling movement.

The tool-steel roller-bearing parts are completely encased and protected against the access of dirt and moisture. The bearings can be set up closely against the wear plates carried by the sill of the car so that they will assist the center-pivot bearing to support the weight of the car body. Thus, teetering motion of the car will be limited to the amount permitted by the play of the springs.

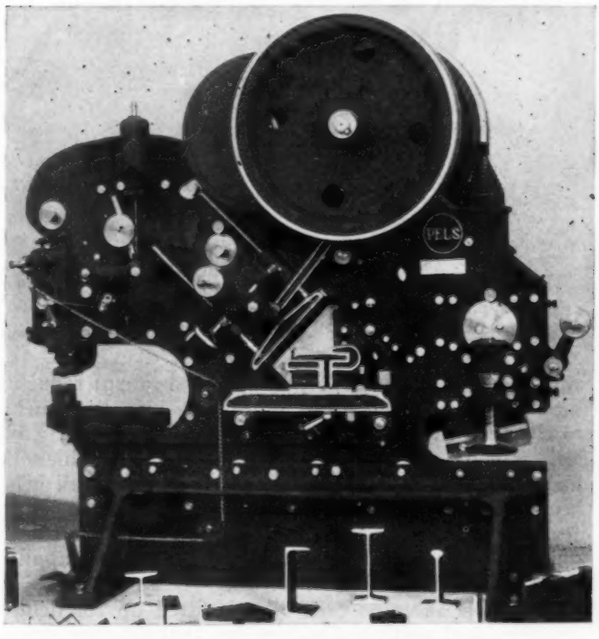
The roller-bearing side bearings are designed to reduce wheel flange wear, lessen rail friction and to assist in tractive force, particularly when the train is rounding curves. The bearing is manufactured and is being exhibited by Messinger Bearings, Inc., Philadelphia, Pa.

Pels Combination Punch and Shear

THE Henry Pels & Company, Inc., New York, has on display at its booth the combination punch and shear shown in the illustration which is designated by that company as its MA 20 machine. The frame consists of heavy rolled-steel plates. The punch head is full floating and counter-balanced, the punch being designed to float over the work, setting on it lightly or stopping above it at any desired height. The punch can also be set on the work by a hand lever and will remain in that position until the operator is ready to punch the hole. The die blocks permit the punching of flanges and webs of standard beams, channels, girder beams, etc.

The angle, bar and tee cutter is comprised of large size knives, a double spindle hold-down and a removable graduated bevel gage which moves on a diagonal slide which is designed to bevel angles and tees in a horizontal position. Angles are cut square and beveled four ways without adjustment of the knives. Tees, rounds and squares can also be cut without a change of knives. Flanges and stems of tees can also be beveled. The shear knives are 12 in. long and operate with a 1½-in. stroke. The stroke of the punch and the angle bar and tee cutter is also 1½ in.

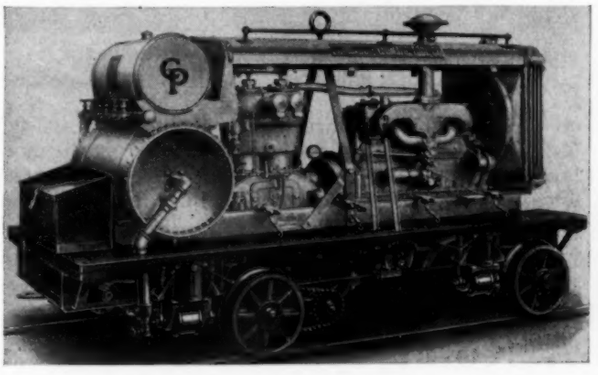
The machine is designed for belt-connected motor drive, but gear connected motor drive can be furnished. The machine requires a 7½-hp. motor for operation, the flywheel speed being 420 r.p.m., each tool operating at 28 strokes per min. The machine is 8 ft. 2 in. long, 4 ft. 3 in. wide, 6 ft. 10 in. high and weighs approximately 9,200 lbs.



The Pels Combination Punch and Shear

A Self-Propelled Portable Compressor

THE Chicago Pneumatic Tool Company, Chicago, has in its exhibit an air-operated self-propelled portable compressor for track maintenance work. Not only does the compressor unit supply air power to CP tie tampers and other pneumatic tools on the job,



The CP Self-Propelled Portable Compressor

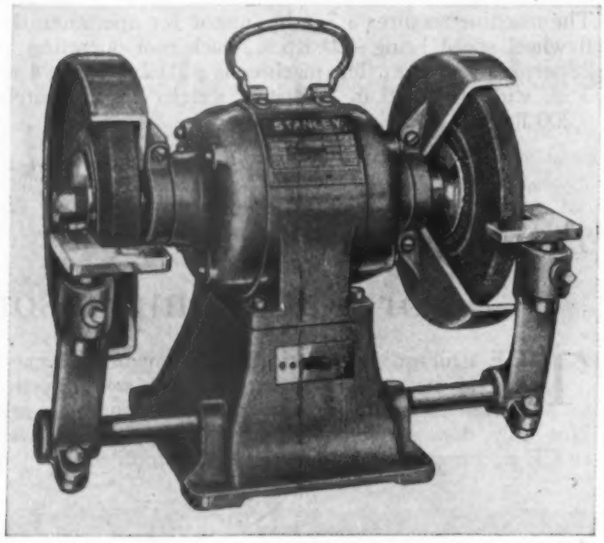
but also, by the same power, propels itself to and from the job. The unit is propelled by the No. 6 CP Little Giant air motor. The motor is mounted on the underframe and is connected by a roller chain to the driving wheels of the truck. Every operation of the propelling motor is controlled by one hand lever. The normal operation of the compressor is not altered when operating the propelling mechanism, an advantage on progressive work such as tie tamping, spike driving, rail bolting, etc. A speed of 15 miles an hour is obtainable.

Air-operated lifting jacks are provided for raising the unit, and transverse wheels roll it off the main track to any desired location. It is also equipped with a convenient lifting bale. The air compressor itself is driven by a gasoline engine and is available in sizes of 110, 160, 220, 265 and 310 cu. ft. per min. displacement.

THE NORFOLK & WESTERN has placed orders for 40,000 tons of 130-lb. rail, 30,000 tons being ordered from the United States Steel Corporation and 10,000 tons from the Bethlehem Steel Company.

Stanley Bench Grinder

A BENCH grinder is being exhibited by the Stanley Electric Tool Company, New Britain, Conn., which is equipped throughout with ball bearings and which is furnished with two grinding wheels, two adjustable wheel guards, two tool rests and a rubber-covered cable. The armature shaft is mounted on seal-type bearings to prevent dirt and grit from entering the motor housing. It can be furnished with either 5-in. or 6-in. wheels and is so designed that it can be mounted either on a bench or on a pedestal.



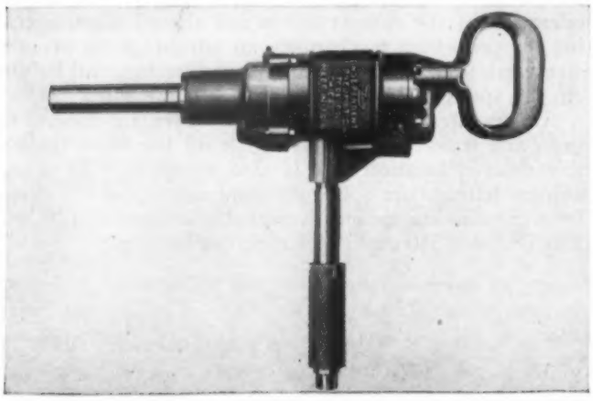
The Stanley Bench Grinder

A Rotary Pneumatic Drill for Car Work

THE Independent Pneumatic Tool Company, Chicago, is exhibiting its 253Y rotary pneumatic drill. Its light weight, simplicity of construction, and ease of operation make it well adapted for car construction and repair work.

The speed of the Thor 253Y drill does not vary as in the piston type air drill, for the reason that it is equipped with a governor. This governor works in two ways; when the drill is at peak load, it automatically opens and admits as much air as necessary to do the job efficiently. When the motor is running idle, the governor automatically decreases the air thus saving wear and tear on the moving parts. This feature results in longer life for the drill, lower maintenance costs, and lower air consumption.

The 253Y can be used as a drill, reamer, screw driver, or nut setter. The drilling capacity is ⅝ in. and reaming capacity ½ in. The speed is 450 r. p . m. When converted into a screw or nut driver, it can be used for numerous jobs in car construction work.



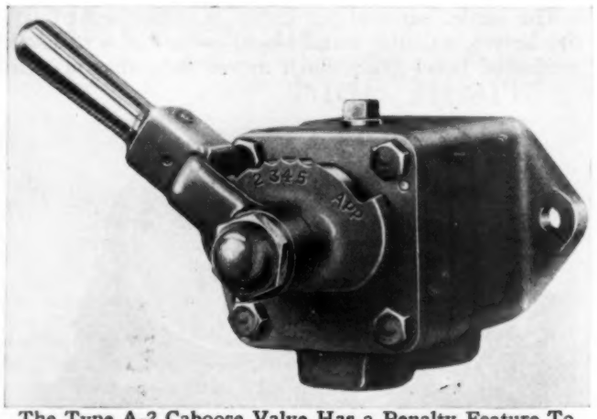
Thor No. 253Y Rotary Pneumatic Drill

Caboose Valve Designed to Replace Cutout Cock

THE Westinghouse Air Brake Company, Wilmerding, Pa., is including in its exhibit two types of caboose valves, designed to take the place of the cutout cock commonly located in the caboose and used for making applications from the rear end of a freight train when necessary. The lack of flexibility with the cutout cock has prompted the development of valves expressly for the purpose, with which the reduction may be controlled to any desired rate.

To comply with differences in operating practice on different railroads, the caboose valve is furnished in two forms: The A-1 with which any desired rate of reduction may be made, after which the handle may be returned to closed position, and the A-2 (illustrated) with which any rate of reduction may be made, after which the handle cannot be returned to closed position until it has been moved to full application position. This penalty feature has been incorporated in the A-2 valve for the purpose of discouraging unwarranted brake applications from the rear end of a train.

A sample valve of each type is fitted up for demonstration, and sectioned valves are available for inspection.



The Type A-2 Caboose Valve Has a Penalty Feature To Discourage Unwarranted Applications

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Saving Motor Car Weight

THERE are many diversified reasons for saving weight in the design of certain parts of cars and locomotives. These may be important, but because of the many ramifications involved, the subject does not lend itself readily to general discussion except for the fundamental reason for saving weight, i. e., the cost of saving weight balanced against the cost of hauling it. It is claimed that the cost of substituting aluminum for steel is twenty cents per pound saved. The cost of hauling may be only three cents a pound per year and the substitution in such a case is scarcely justified unless there is some other reason. If the cost of hauling is five cents, the twenty per cent profit on the investment offers an attraction.

In the case of rail motor cars where gasoline is used for fuel, weight saving is important. This raises a question of motor car design versus railroad specifications. Some of the specifications insisted upon add materially to the weight of the car with the result that when the car is completed it cannot perform in accordance with its original design. Rail motor cars should be designed as units rather than be assembled from miscellaneous parts. If railroad specifications interfere seriously with the performance of the car, it is important to determine to what extent the specifications are essential and to what extent they are simply tradition.

Written or Verbal Reports

DUE largely to the fact that it is not entirely past the organization stage, the Motor Transport Division is still building its program largely around verbal reports. Unavoidable though these may be until the committee organization of the division has been completed, and until these committees are functioning smoothly, the fact remains that written reports are more desirable from the standpoint of a smoothly and constructively running program.

In many instances, the most interesting and helpful parts of convention programs are not the reports themselves but the discussions which follow their presentation. Thorough and considered discussion of reports however, cannot easily be given without some advance preparation, and this is obviously impossible in the case of verbal reports. When committee reports are written well in advance of the meeting at which they are to be presented, and are made available for study by the delegates to the meeting sometime before it is held, more accurate and more pertinent discussion usually is the result. Especially should this be true of the Motor Transport Division, in the meetings of which highly controversial questions are constantly cropping up.

The desirability of written rather than verbal reports is recognized by the officers of the division, and it is hoped that these may be arranged for when the next meeting of the division is held.

More Complete Car Inspection Possible

ONE of the most promising developments of the past year looking toward the more careful and thorough inspection of freight cars in transit is the inspection pit installed at the eastbound receiving yard of the Pennsylvania at Altoona, Pa., as described in the paper read by R. L. Kleine, assistant chief of motive power of the Pennsylvania, during Thursday's session of the Mechanical Division. This pit, located in the track and providing a protected enclosure for the inspector with his head at approximately the level of the top of the rails, is equipped with complete lighting facilities for night operation. Trains can be inspected while passing over the pit at the rate of two miles an hour, and highly satisfactory results have been attained in inspecting the underside of trucks, brake rigging, draft attachments, under frames, and noting defects not discovered by ordinary inspection methods.

In slightly over a two-months period, Mr. Kleine's paper shows that the total number of defects discover-

ed by means of this pit was 987, or about 15 a day. Of these, 484 were visible in ordinary inspection and 503 were not visible in ordinary inspection. Of a total of 174 potential accident-producing defects, 102 involved cracked arch-bars,15 missing box-bolt nuts, 11 missing column-bolt nuts, one broken column bolt and nine broken brake hangers. The discovery of these defects in the short test period mentioned constitutes a record which justifies the careful consideration of this new facility in any plans for tightening up car inspection, reducing car failures and minimizing train accidents, and delays. It is noted with interest that the Pennsylvania has secured such good results with this inspection pit that plans are contemplated for extending its use at other points to supplement regular receiving-yard inspection.

When Railways Manufacture

THE presentation of a report at Wednesday's meeting of the Purchases and Stores Division on the Control of Manufacturing Operations in Railway Shops again brings into issue the whole question of railway manufacture. The general tendency has been to reduce the extent of this manufacturing. Those who follow the matter closely have revealed a favorable disposition of late to recognize the desirability in all manufacturing of developing and maintaining accurate and complete cost records that will enable a road to compare its cost with the cost of materials purchased in the market. Such recommendations are again contained in the committee's report this year.

Recommendations of this kind, in so far as they are premised upon the proposition that the railway is ready to buy its materials if they can be bought at a lower final cost, are commendable. But many of these attempts at accounting, upon careful analysis, savor more strongly of a desire to justify self manufacture than to challenge it. To the extent that such studies are not clearly intended and fostered to get at the real facts, dissertations on so-called cost accounting and fact-finding are not only futile, but an additional source of waste.

A most interesting thing about the report presented Wednesday was that, in preparing the way for a discussion of how manufacturing costs should be controlled, it disclosed some of the chief reasons why a railroad should proceed exceedingly cautiously before it does manufacture—the necessity, for example, of building separate shops in special locations for efficient manufacture, the impracticability usually of securing mass production and at the same time maintaining low inventories and stabilized forces without loss to the railroad, and the problem of inspection and tests, which is proverbially less thorough and exacting in connection with shop manufactured materials than in connection with purchased materials.

A True Story with a Moral

A NUMBER of years ago a paper on a subject pertaining to the application of electrical equipment to passenger cars was presented at a convention of the Mechanical Division. It was an excellent paper and contained much constructive information. But, as frequently happens, it did not stimulate much discussion. The chairman was about to dismiss the subject with the customary vote of thanks to the author, when a mechanical-department officer asked permission to speak.

This officer appreciated the value of the paper and felt it was worth a real discussion. He admitted that he knew comparatively little about electricity, but nevertheless he had a few questions he wanted to ask. Why was it necessary to have separate generating equipment on each car? Why wasn't it practical to have a generator on the locomotive produce electric current for the entire train? Why did not the railroads use electric current for other purposes besides lighting, such as refrigeration, cooking, raising and lowering the windows, etc? The remarks, which interspersed his questions, sounded to the railroad men present like a Jules Verne romance. He asked a lot of other "foolish questions" which caused considerable discussion, some of which amounted to good-natured railery.

It so happened that there were a number of newspaper reporters present. At last here was something in all the maze of technical discussion that the general public could understand. However, instead of broadcasting the remarks as something to look forward to as a development in railroad passenger transportation in the future, they reported everything that was said as actual developments. The story was published in a large number of newspapers throughout the country and caused considerable editorial comment.

The executive officers of the ralroad by whom that mechanical department officer was employed read with considerable interest the numerous articles and editorial comments. "Well," they said, "why talk about it. Let's do it." Today every one of the "wild ideas" proposed at that meeting are part of the equipment of that road or have been developed to such a point that they are considered practicable.

The vision of imagination is the beginning of progress.

Reclamation -- A Problem of Production

STANDARDIZATION has had its fanatical supporters much the same as prohibition, the elimination of war, or the League of Nations. For many years it was considered by many to be the cure of all industrial ills. However, an overdose of standardization in a number of instances revealed the fact that progress in the line of further development could be stopped because of the difficulty in changing a standard after it had once been established. The establishing of standards was an

important factor in the development of reclamation of materials and parts by the railroads. There would be little work for the reclamaterion plant to do if it were not for the fact that there are many parts standard to more than one class of cars or locomotives.

Today we find the standardization of parts and equipment on a common-sense basis. Few railroads will stand in the way of improvements in design, although it may mean the elimination of certain parts which have been made standard. Designers and users are now co-operating in the development of new equipment as never before. Although the utilization of standard parts carried in stock is an important factor in design, still it does not stand in the way if something better can be used.

Thus, parts standard to equipment a few years ago, even only a few months ago, may now be obsolete. Nevertheless, instances can be cited where a reclamation plant has expended considerable time and money in reclaiming materials and parts which have been made obsolete because of the purchase of new equipment of improved design. If those in charge of the reclamation plant had known or had been informed as to the details of the new designs which were in the process of development, instructions could have been issued to cease reclaiming certain items which there was a possibility of being made obsolete, and thereby save considerable time and money. After all the management of a reclamation plant has a problem of production similar to that of the manufacturing department of a large railroad machine shop, or making repairs to cars and locomotives. Production, whether it be a locomotive repair shop or reclamation plant, it should be regulated according to the demand. Reclaimed parts must conform to certain tolerances, finish and condition, which have been established, in the majority of cases by the Mechanical Division. *Unless a reclamation plant is managed and operated* to produce serviceable parts in quantity with a minimum of labor and expense, no savings in accounting or stores keeping will justify its existence.

The Programs for Today

THE three divisions of the American Railway Association now in session at Atlantic City, will all hold morning sessions today and the Motor Transport Division will also meet in the afternoon. The Purchases and Stores Division and the Motor Transport Division will hold their final meetings for this year.

The Mechanical Division will adjourn to next Monday, the first three days of next week being devoted to programs largely related to motive power subjects, electric lighting and electric rolling stock. The programs follow:

Mechanical Division

The Mechanical Division meeting will be called to order in the room to the right of the stage in the Exhibit Hall at 9:30 a. m. and will adjourn at 12:30 p. m.

Address: M. J. Gormley, Executive Vice-President and Chairman of Car Service Division, American Railway Association.
Discussion of Reports on:
Car Construction.

Safety Appliances (including report from H. A. Johnson, Director of Research in Charge of Power Brake Investigation and Automatic Train Line Connector Investigation).
Couplers and Draft Gears.

Purchases and Stores Division

The Purchases and Stores Division will meet at 9:00 a. m. in the meeting room at the left of the stage in the main Exhibit Hall of the Auditorium and will adjourn at 1:30 p. m.

Individual Paper—"Rating of Efficiency of the Purchasing Department," by P. L. Grammer, Assistant Purchasing Agent, Pennsylvania Railroad.
Subject 10—Control of Materials Stocks and Co-Ordinating Procurement with Actual Needs.
Subject 11—Pricing Methods.
Subject 21—Purchasing, Storage and Distribution of Equipment and Supplies Used in Dining Cars, Hotels and Commissaries.
Subject 23—Promotion of Conservation Methods in Use of Materials.
Subject 17—Stores Department Safety Practices.
Subject 18—Terminal Railway Storekeeping.
Subject 7—Workable Rules in Connection with the Carrying Out of the Provisions of Section 10 of the Clayton Anti-Trust Act.
Subject 9—Locomotive Fuel.
Subject 20—Joint Committee on Metric System.
Report of Resolutions Committee.
Report of Memorials Committee.
Report of Nominating Committee.
Election of Officers.

Motor Transport Division

The Motor Truck Section of the Motor Transport Division will meet in Room 12 of the Municipal Auditorium at 9:30 a. m., and also again in the afternoon. The meeting room is adjacent to the gallery above the ballroom and can readily be found by following the signs. R. K. Stackhouse, chairman of the Motor Truck Seciton, will preside.

Reports of Regional Chairmen on the following subjects:

1. Trucking rates and tonnage moving by trucks between important points within the following radii with recommendation as to action necessary to take to meet the situation:
   50 miles, such as Baltimore-Washington, D. C. District.
   100 miles, such as New York-Philadelphia District.
   150 miles, such as Duluth-St. Paul-Minneapolis District.
   250 miles, such as St. Paul-Fargo District.
   500 miles, such as San Francisco-Los Angeles District.
2. Existing arrangements of trucking concerns in connection with pickup and delivery service. Extent and effect of such arrangements at the present time on various railroads.
3. Information as to the nature, extent and effect of truck competition on the traffic and revenue of the carriers. Action taken by carriers to meet this situation and results therefrom.

Entertainment

A new and unusual feature has been scheduled for the evening.

10.30 A. M.—Orchestral Concert, Ball Room. William Klaiss, Feature Pipe Organist. Indoor Golf.
3.30 P. M.—Orchestral Concert, Ball Room. Impromptu Dancing. William Klaiss, Feature Pipe Organist. Indoor Golf.
9.00 P. M.—*Araršma* Frolic in the Ball Room and Corridors.
American Meclido, (Driection H. T. McConnell).
Pands Circus. (Direction G. E. Roberts).
Motran Dancing.
ManFan Super Music.
William Klaiss, Feature Pipe Organist.
The Four Melody Harmonists.

Lost and Found

FOUND: Stick pin; also one ear ring. Call at office of Secretary-Treasurer, J. D. Conway, Auditorium. Lost: Badge 4973, Mrs. A. C. Deverell, Marlborough-Blenheim Hotel; also Badge 5082, Mrs. J. J. Hennessy. Please return to owners or to the Enrollment booth.

Pennsylvania Special to Chicago

THE Pennsylvania will run a special train from Atlantic City to Chicago on Wednesday, June 25, leaving Atlantic City at 5 p. m., Eastern Standard Time (6 p. m. daylight-saving time), to accommodate attendants at the conventions who wish to return to Chicago immediately after their close. Reservations may now be made at the Municipal Auditorium ticket office on the arcade facing the boardwalk. The train will carry a dining car from Atlantic City.

Mechanical Division Program Slightly Changed

LANTERN slides of the new type E coupler will be shown today in connection with the report on couplers and draft gears. The report on safety appliances, to be read by H. A. Johnson, director of research of the American Railway Association, will be illustrated with a moving picture of four reels, showing the operation of the power brake test train in the Siskyou mountains and the method of making the tests. The Mechanical Division program for the day will be slightly changed by the presentation of the report on couplers and draft gears preceding that on safety appliances.

Watch that Undertow!

MRS. DEEMS, wife of Walter A. Deems, New York sales engineer of Manning, Maxwell & Moore, Inc., had a narrow escape from drowning at the Auditorium Baths beach on Wednesday. The action of the undertow and cross-currents in connection with one of the big drains from the auditorium created a hole into which Mrs. Deems stepped, unexpectedly finding herself in water over her head. The wave action washed her up to the drain pipe which she seized and from which she was rescued by a member of the Atlantic City beach patrol. The members and guests in attendance at the convention will do well to watch for holes in the beach caused by undertow and cross-currents, unless they are desirous of seeing the efficient beach patrol in action. Mrs. Deems is to be congratulated on her escape and also on her initiative and courage. She was the first member of the convention to enter the water Wednesday and, not deterred by her experience, she has been in swimming several times since.

Registration Figures

THE following figures give the classified registration at 4 o'clock yesterday, as compared with similar data for the past four conventions. No comment is necessary—the figures talk for themselves.

	1922	1924	1926	1928	1930
Mechanical, Division V	478	650	775	680	699
Purchases and Stores, Division VI	16	17	400	477	356
Motor Transport, Division VIII				30	57
Railroad guests				90	368
Railroad ladies	337	475	650	700	605
Supply men	1771	2115	2411	2257	2088
Supply ladies	384	484	570	544	424
Special guests	180	305	250	17	133
Complimentary				242	—*
Total	3166	4046	5056	5037	4730

*Complimentary regisfrations are this year included with Railroad Guests.

Railway Club Secretaries to Meet

THE Society of Railway Club Secretaries is planning to hold a luncheon meeting at the Marlborough-Blenheim Hotel on Saturday of this week. This group forms a clearing house for the best methods and practices in strengthening the railway clubs and usually meets at Atlantic City during the June conventions.

One Year Old

YESTERDAY marked the anniversary of the first run into the Reading Terminal, Philadelphia, of the pioneer multiple-unit control oil-electric train. Capable of a speed of 70 miles an hour, this 110-ton two-car train, equipped with the Westinghouse 300 h. p.

Oil Electric Car at the Reading, Pa. Station

oil engine, operates at a fuel cost of approximately 2½ cents per mile.

The train is in daily operation on the Wilmington & Columbia branch of the Reading System.

A. R. E. A. Visitors

THE American Railway Engineering Association is in evidence on the boardwalk this week in the persons of E. H. Fritch, secretary; W. C. Cushing, valuation engineer of the Pennsylvania, and J. C. Irwin, valuation engineer of the Boston & Albany. At a committee meeting yesterday Mr. Irwin was honored with the chairmanship of the Special Committee on Standards of the A. R. E. A., to succeed Mr. Cushing. This committee, which represents the Engineering Division of the A. R. A. in the National Standards Council, has distinguished itself for the contributions it has been making through the A. R. E. A. and the National Standards Council, has distinguished itself for the contributions it has been making through the A. R. E. A. and the National Standards Council to the Standardization progress.

Exhibit Correction

THE Isothermos Corporation of America, with headquarters in New York, has space 19, not 29, and it is represented by F. G. Willhofft, G. H. Ferguson and T. E. Newberry.

Orders and Inquiries

THE ERIE has ordered three combination mail and express cars, 70 ft. long, from the American Car & Foundry Company. It is also inquiring for two mail and express cars.

The Boston & Maine has ordered four dining cars from the Pullman Car & Manufacturing Company.

The Central of Georgia is inquiring for two baggage and express cars and also for one baggage and mail car.

The Aluminum Company of America is inquiring for 25 hopper cars of 70 tons capacity.

The Anglo-Chilean Consolidated Nitrate Corporation is inquiring for 350 steel ore cars of 30 tons capacity.

Grand Ball A Big Success

THE first Grand Ball of the railway conventions to be held in the new Auditorium was given in the beautiful ballroom last night. In describing it, as well as the decorations, the ladies' gowns and the complete ensemble we could use many expressive adjectives, but we refrain and make the simple statement that the event probably surpassed in excellence any previous function of a similar nature in the history of these gatherings.

Promptly at 9.30 the grand march was started. In the front line the leaders and their ladies were the evening's guests of honor. They were Messrs. W. Davidson, G. E. Smart, A. P. Russell, Gilbert E. Ryder, C. E. Walsh, P. J. Neff, E. Wanamaker, S. G. Down, W. J. Farrell, V. R., Hawthorne, G. M. Campbell and J. D. Conway.

The added entertainment features of the night were songs by Miss Mae Mackie, contralto, Philadelphia Civic Opera Company; William Klaiss, feature pipe organist; and the Four Melody Harmonists, a male quartette.

Credit for making the arrangements and the management of this highly successful social function are due to G. L. Gordon, chairman of the Entertainment Committee, assisted by a sub-committee consisting of J. W. Fogg, chairman, C. M. Hoffman, vice-chairman, and the following members:

H. G. Barbee
W. L. Bayer
L. T. Burwell
A. E. Biddle
L. A. Carpenter
H. O. Fettinger
C. E. Hale
O. C. Hayward
W. J. Hedley
C. Jarden
A. G. Johnson
B. S. Johnson
I. H. Jones
J. C. Kuhns
E. Laterman
L. J. McCombs
L. B. Rhodes
J. C. Shields
C. W. Sullivan
J. H. Van Moss
J. R. Wetherald

Oil-Electric Car Fills Hard Service

A 9½-MILE grade with a maximum of 1.04 per cent southbound out of Birdsboro and a 6½-mile grade with a maximum of 1.28 per cent northbound out of Wilmington, Del., on the Wilmington & Columbia division of the Reading System, plus frequent stops, make a severe service.

Quite often an extra car movement is required, varying from 30 to 75 tons. The two 110-ton oil electric

There Are 44 Stations in the 73.2 Route Miles of Line

trains make the running time. The power plants used are 300-hp. Westinghouse oil engines equipped with torque-governor control.

Today's Entertainment

TODAY'S entertainment features are somewhat out of the usual run in so far as they refer to the evening's program.

The usual orchestral concert will be held in the ballroom at 10.30 o'clock, followed in the later forenoon by indoor golf. In the afternoon many will enjoy the impromptu dancing.

Fun a-plenty is promised for the evening by Chairman Gordon and his Entertainment Committee. It will consist of an Ararsma (note well the spelling of this word) Frolic, the frolic to be made up of the American Meclido, under the direction of H. T. McConnell; Pands Circus, directed by G. E. Roberts; Motran Dancing, ManFan Super Music, William Klaiss, at the organ, and the Four Melody Harmonists.

A sub-entertainment committee, led by C. M. Hoffman, chairman, and G. B. Christian, vice-chairman, will be in charge.

District Elections

THE district election meetings for members of the Executive Committee of the Railway Supply Manufacturers' Association will take place on Saturday morning, June 21, between the hours of 10:00 a.m. and 11:30 a.m., in the office of the Secretary-Treasurer Conway. Such meetings will be held by the second, third, fourth, fifth, sixth and seventh districts. The terms of four of the members of the Executive Committee expire on September 1, 1930, and two other members must be elected to fill vacancies due to resignations—these two vacancies having been temporarily filled by appointment pending the election.

The members who retire on September 1, 1930, and whose successors must be elected are Charles H. Gayetty, third district; W. E. Wine, fourth district; Harry E. Daniels, fifth district, and D. L. Eubank, sixth district. J. E. Brown resigned from the second district and his position during the year has been filled by appointment by C. W. Floyd Coffin. George L. Davis also resigned in the seventh district and this position during the year has been filled by appointment by F. J. O'Brien.

P. & S. Discussers

AN analysis of the last year's proceedings of the Purchases and Stores Division attests to the fact that railway supply officers are always prepared to hold up their end of an argument. During the proceedings 69 members, not counting chairmen of committees, participated in the discussions of the various reports and papers, these men entering the fray 312 times.

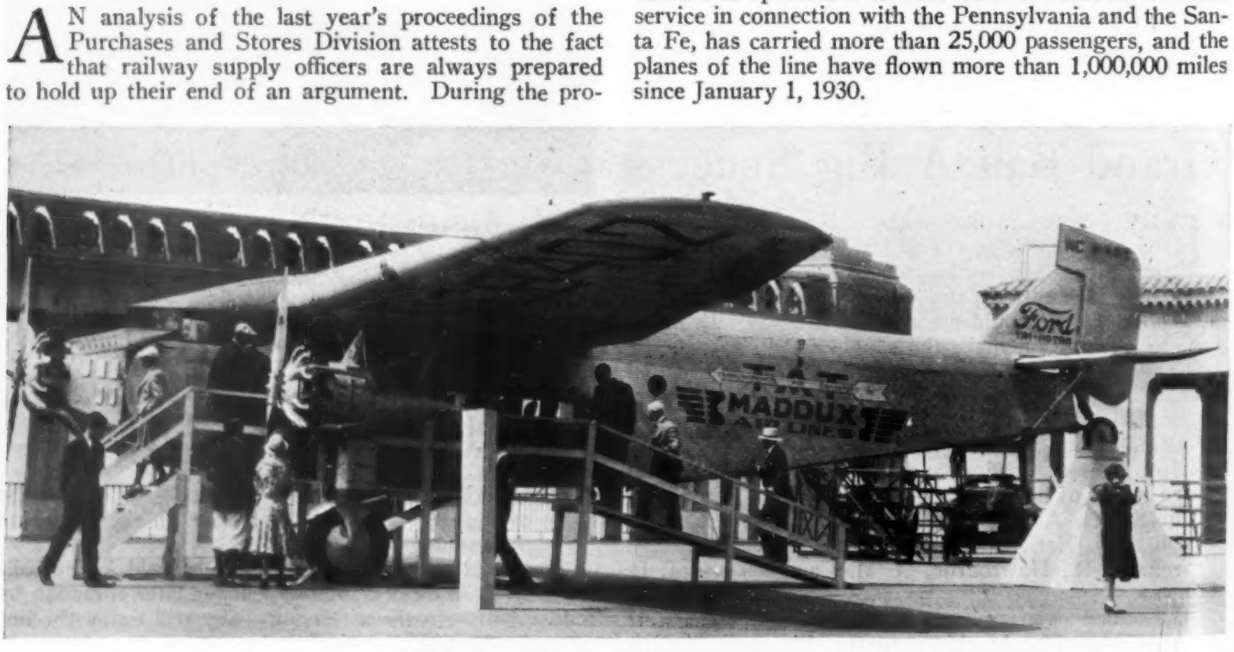
Heavy artillery was on the ground in the presence of A. S. McKelligon, who spoke 14 times, J. V. Miller, C. M. St. P. & P., 26 times; L. F. Duvall, Atlantic Coast Line, 14 times; E. W. Peterson, Bangor & Aroostook, 13 times; and O. Nelson, Union Pacific, 11 times. Approximately 20 men spoke 5 or more times, including W. F. Jones, New York Central, 6 times; J. U. King, Atlantic Coast Line, 6 times; M. M. Moffitt, Southern Pacific, 5 times; C. B. Tobey, Lehigh Valley, 9 times; W. W. Griswold, Wheeling & Lake Erie, 7 times; D. R. Elmore, Fruit Growers Express, 6 times; J. C. Neph, Southern Pacific, 8 times; U. K. Hall, 8 times; and G. A. Goerner, C. B. & Q., Jack Mahaney, Chesapeake & Ohio, and D. C. Curtis, C. M. St. P. & P., each with 5 contributions to their credit.

The heaviest discussion occurred in connection with the report on the handling of materials with industrial trucks and supply trains, in which J. V. Miller, exponent of the use of skids in supply train operations, was the star performer.

Airplane on Exhibit for First Time

THE tri-motored Ford Plane of the TAT-Maddux Air Lines, which can scarcely be overlooked by anyone entering the Auditorium, is the first airplane to be exhibited at the railway conventions in Atlantic City. In fact, the plane, which has a capacity of eleven passengers and a crew of three, is said to be the first of its kind ever to appear on the boardwalk. An elevated platform along the fuselage permits visitors to see the interior of the passenger cabin and the pilot's cockpit.

The fleet of the TAT-Maddux Lines consists of twenty-five of these Ford planes, most of which are in daily use. This air line, which is affiliated with the Pennsylvania and operates a 48-hour coast-to-coast air and rail service in connection with the Pennsylvania and the Santa Fe, has carried more than 25,000 passengers, and the planes of the line have flown more than 1,000,000 miles since January 1, 1930.



The First Airplane to be Exhibited on the Boardwalk Is Viewed by a Steady Stream of Conventionites

Additional Freight Cars Exhibited

IN addition to the freight cars referred to in Wednesday's issue of the *Railway Age*, a number of others have now been placed on the exhibition tracks at the Reading Terminal.

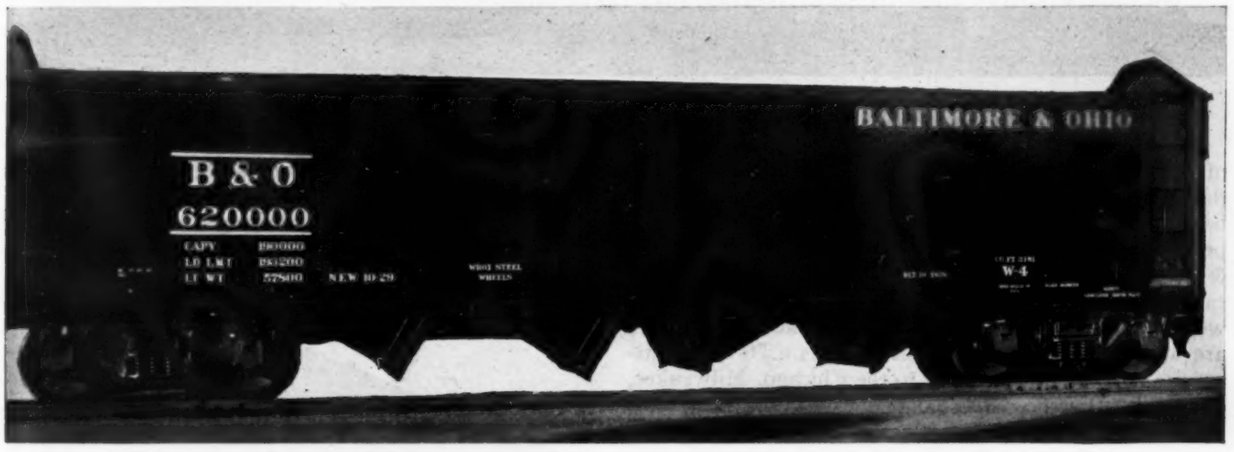
Tank Cars

There are now three tank cars of different types in the group on the Reading tracks, all of which have running boards and dome platforms of A. W. Diamondette steel plates made by the Alan Wood Steel Company. The 75-ton sulphur tank, has already been referred to. The second is a 50-ton car, class I. C. C.-103, built by the General American Tank Car Corporation and leased to the American Tar Products Company. It has a capacity of 8,039 gal. and is used to ship tar and asphalt for road work. Heater pipes are provided. Both of these cars are protected by special aluminum tank car paint manufactured by the Koppers Products Company, Pittsburgh, Pa. The Alan Wood Steel Company is also showing a section of a box car roof with longitudinal and latitudinal running boards of A. W. Diamondette sheets.

The third tank car belongs to the Atchinson, Topeka & Santa Fe. It was built by the General American Tank Car Company and is of class I. C. C.-103. The light weight of the car is 65,000 lb. and it has a nominal capacity of 70 tons. The water capacity of the tank is 16,110 gal. or 134,320 lb. The trucks are of the Dalman type with 6-in. by 11-in. journals. The feature of the car which will attract particular attention is the combined cast-steel center sill and tank bottom furnished by the General Steel Castings Corporation.

Wine Equipped Cars

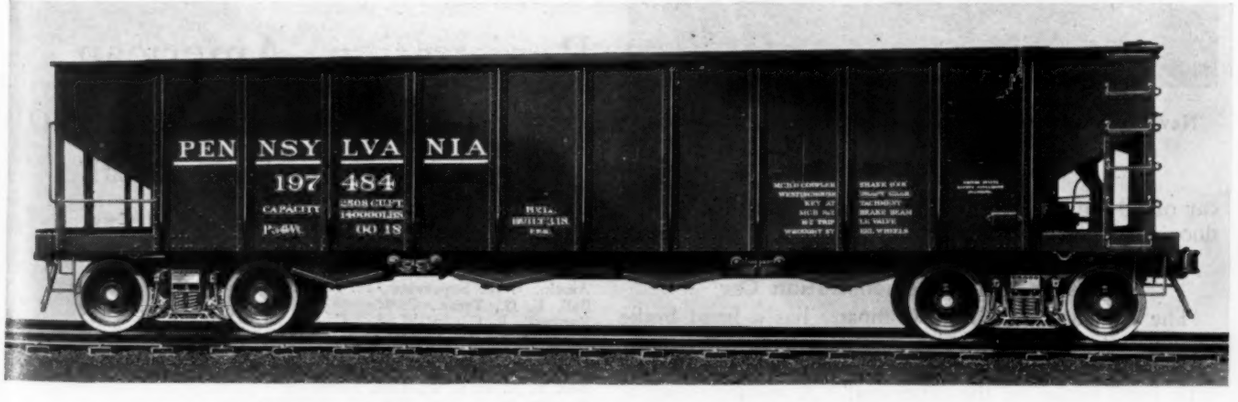
The Wine Railway Appliance Company is showing a hopper and a gondola car equipped with their door fixtures. The 70-ton hopper car was exhibited two years ago and fully described in the *Railway Age*, June 25, 1928. The other car, Chicago, Milwaukee, St. Paul & Pacific No. 361,824, is a composite type gondola of 70 tons capacity. This car has Dalman type trucks with 6-in. by 11-in. journal which gives a load limit of 150,-600 lb. with the light weight of 59,400 lb. The inside length is 48 ft. 6 in. and the capacity 2,654 cu. ft. Drop end doors are provided and eight drop doors in the bottom, dumping toward the rail.



Baltimore & Ohio 95-Ton Hopper Car of Welded Construction

Enterprise Cars

The Enterprise Railway Equipment Company is represented by four cars of various types. The first is a 50-ton general-service gondola built by the Bettendorf Company. It weighs 48,700 lb. and has load limit of 120,300 lb., an inside length of 41 ft. 0 in. and a capacity



Pennsylvania 70-Ton Hopper Car Having Trucks With Timken Inboard Roller Bearings

New York Central Special Type Gondola Car Loaded With Six Merchandise Containers

of 1,896 cu. ft. The sides are of wood and the ends of the corrugated steel plate type. There are eight drop-bottom doors on each side. The second is a 70-ton hopper car with three hoppers, built by the American Car & Foundry Company. It is 40 ft. 0 in. long inside, has a capacity of 2,717 cu. ft., a load limit of 158,000 lb. and weighs 52,000 lb. The door mechanism and door hinges are of Enterprise design. The third is a 70-ton multi-service hopper car belonging to the Chicago, Milwaukee, St. Paul & Pacific. The doors, which are arranged to operate in two units, provide for side and center distribution of ballast. The fourth is an automobile box

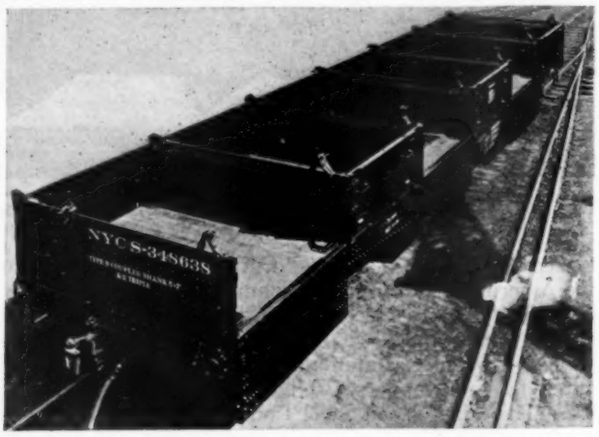
New York Central Special Gondola Showing Container Compartments

car of 40-ton capacity and fitted with 12-ft. double-side doors of Enterprise design and fixtures.

Klasing Brake Demonstration Car

The Klasing Car Brake Company has a hand brake demonstration box car which is fitted with the short-lever type hand brake on one end and the horizontal-wheel type hand brake on the other end. A dynamometer is arranged to show the hand brake pull. Inside the car are sections of the three types of Klasing hand brakes now in service.

Illustrations of some of the freight cars on the track



New York Central Container Car with Three Sections of Side Dropped for Removal of Containers

exhibit of which reference was made in the June 18 issue of the daily *Railway Age* are shown herewith.

Registration, American Railway Association

Division V—Mechanical

Allstrand, H. P., P. A. S., M. P. & M., L. & N., Marlboro
Anderson, P. W., G. F. C. D., P. R. R.
Andrews, S. B., E. M. P., C. & O., P. M. & N. P., Chalfont
Anthony, Thos. C., Asst. For., Reading, Ambassador
Austin, J. B., Supervisor, P., LaFayette
Ball, L. G., Treas., C. I.
Bardwell, R. C., S. W. S., C. & O., Ambassador
Barry, J. L., M. M., N. & W., Ritz-Carlton
Batson, J. F., Genl. Car Insp., P. R. R.
Beeson, Robt. J., M. S., Mather Stk. Car, Ambassador
Bell, F. J., D. C. F., Erie, Traymore
Bennett, H. J., Gen. For., P., Willsboro
Berry, C. W., Shop Insp., P. R. R.

Bevan, Thomas D., E. of P. H., C. R. R. of N. J., Morton
Bingaman, Leon M., Trav. F., Reading, Strand
Black, W. G., Mech. Asst. to Pres., C. & O. & P. M., Marlborough
Boehuke, H. A. Ldg. Draf., N. Y. C., Jefferson
Boring, T. J., G. F. M. C. B. C. H., Penna., Ambassador
Briancardi, Jos. F., Ch. Drafts, N. Y. C., Jefferson
Brock, Jesse, Genl. Car Inspector, Penna.
Broo, C. W., G. C. F., N. Y. C. & St. L. Ry., Ritz-Carlton
Burns, R. C., Asst. Engineer, Penna.
Burson, H. A., C. A. B. I., Penna.
Buzzard, Ezra Y., Trav. Insptr. M. P., Reading, Lexington
Calkins, A. E., S. R. S., N. Y. C., Traymore
Cannon, C. F., Spec. Insp., B. & O., Princess
Cherry, Chas. P., G. M. Supvr., P. R. R., Jefferson
Conahan, C. F., A. B. I., Lehigh Valley, Iroquois
Cook, A. S., G. C. F., N. Y. C. & St. L., Shelburne
Coutant, G. E., Asst. Supt. M. P., Wabash, President
Cregan, John F., Div. Car Foreman, Erie, Penhurst
Cromwell, O. C., Asst. C. of M. P. & E., B. & O., Chalfonte
Crosbie, Geo., Water Service, B. & O., Traymore
Cross, D. W., Dist. S. M. P., Nickel Plate, Shelburne
Dampman, Charles P., Supvr. Fuel Con., Reading, Madison
Diefenderfer, W. H., F. E. H., Reading, Princess
Dinan, D. W., Genl. Manager, N. Y. C., Traymore
Ellis, E. C., G. P. C. I., C. & O., Strand
Faus, H. W., Engr. of Tests, New York Central, Ritz
Feeley, M. R., M. M., Lackawanna, Madison
Ferentz, Andrew J., G. F. C. D., N. J. C., Traymore
Fitzgerald, L. C., Chief ARA Insp., Erie, Penn Atlantic
Gaines, E. C., F. M. S., N. & W., Ritz-Carlton
Gardner, G. C., Jr., M. M., P. R. R., Marlborough
Gaughan, R., F., C. R. R. of N. J., Healy
George, W. A., M. M., Jacksonville Terminal, Ambassador
Giboney, E. S., G. F. C. D., Penna., Louvan
Goings, C. E., S. E., P. R. R.
Gommerman, W. K., Supt. Shops, B. & O., Colton Manor
Gormley, M. J., V. P., A. R. A., Traymore
Graburn, A. L., Asst. Gen. Fuel Agt. C. N., Shelburne
Graff, R. H., Asst. E. R. S., N. Y. C. Lines, Dennis
Gray, Carl R., Jr., V. P. & G. M., C. S. & P. M. & O. R. R., Haddon Hall
Gray, Wm. E., Engr. Draft Gear Tests, A. R. A., Haddon Hall
Grontoft, A. F. C., E. E., N. Y. C.
Hahn, J. H., Foreman, N. & W., Ritz
Hamm, Charles A., Asst. Rd. For., Reading, Princess
Hardelston, Frank H., A. V. P., C. G. W., Chelsea
Hardy, Robert A., H. C. D., Reading, Elberon
Harper, Frank J., G. S. P., N. Y., N. H. & H., Brighton
Hatton, Saml. P., Conductor, A. C. R. R.
Hawksworth, W. H., F. M. D., Penna.
Heck, Frank L., Gang Fore., C. R. R. of N. J., Ariel
Hedeman, Walter R., A. M. E., B. & O., Shelburne
Heiser, Chas. E., Asst. Elect. Engr., Reading, Chester Inn
Hines, F. D., Mech. Asst., Reading, Carlton Manor
Hipkins, C. C., R. F. E., P. R. R.
Hobson, W., Engr. Dept., Phila. Rapid Transit
Horges, A. H., D. M. M., B. & O., Ritz-Carlton
Hughen, J. M., Pres., Penna. Tank Line, Chelsea
Humphlett, W. R., C. N. & L., Ambassador
Isaacson, F. A., Engr., C. C., Santa Fe, Traymore
Irwin, J. C., Val. Eng., B. & O., Dennis
Jackson, J. R., Engr. Tests, M. P., Shelburne
Jenkins, E. M., M. C. B., D. L. & W., Ambassador
Jenks, W. J., V. P., N. & W., Ritz-Carlton
Jenney, C. E., Gen. Agent, C. N., Haddon Hall
Johnson, T. A., F. E., C. of Ga., Ambassador
Kantola, C. F., Lead. Draf., N. Y. C.
Keenoy, R. P., D. S. R. R. V. P., Galen Hall
Kerby, Fred., A. C. M. P., Balto. & Ohio, Castro
Klaussen, E., Asst. Secy., M. C. Assn., Traymore
Kleber, Wm. C., M. S. F., C. R. R. of N. J.
Knopp, Arthur, I. Engr., N. Y. C., Dennis
Knorr, R., S. S., Erie, Madison
Koons, Wayne G., Clerk Legal Dept., Reading
La Mar, A., M. M., P., Dennis
Lantelme, J. P., G. A. B. I., P. R. R.
Lee, F. H., S. F. C. M., B. & O., Haddon Hall
Lefferts, H. I., A. R. F. E., L. I.
Leonard, W. W., Elec. Car Lighting Supvr., B. & O.
Lesure, H. K., M. M., P. R. R., Dennis
Lewis, H. L., G. F. C. R., R. F. & P., Windsor
Lowe, C. I., Sec. to C. of M. P., B. & O., Chalfonte
Luddy, W. E., E. H. F., P.
Lowery, J. P., D. C. F., Erie, Madison
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Manchester, H. C., S. M. P. (Retired), Lackawanna, Marlborough
Martin, F. W., Engr. Dept., Phila. Rapid Transit
Martin, W. E., Ch. Trn. Dispch., Reading, Strand
Matthews, Wm. H., Jr., A. R. F. of E., Penna.
McCue, Thomas B., F. B. M., Reading, Stanley
McDonald, A. F., Supt., Potomac Edison, Traymore
McDonald, John, Inspctr., P. R. R.
McGrew, J. A., C. M. E., D. & H., Ambassador
McManamy, Chairman, I. C. C., Marlborough
McMenamin, Chas. Geo., Gang For., P.
Mechling, J. E., Spl. Insp., Penn., Lafayette
Mecketroth, E. H., G. C. F., B. & O., Colton Manor
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Mott, W. E., Supvr. Pc. Wk., C. of N. J.
Mounce, Robt. S., G. F. C. D., Erie, Pennhurst
Mouser, J. N., G. M., Teem Copper Co., Traymore
Muir, R. Y., M. C. B., P. & W. V., Princess
Murray, E. A., S. S., Grand, Marlborough
Murray, E. A., Shop Supt., C. & O., Marlborough
Myers, H. E., M. C. B., L. V., Dennis
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New, W. E., M. M., K. C. T., Traymore
Nicodemus, E. H., Genl. Mat'l. Supvr., P., Runnymede
Nitrauer, E. Y., D. C. F., Erie, Fredonia
Nordquist, Charles, D. C. F., Erie, Brighton
Nowell, H. T, M. S., C. V., Haddon Hall
O'Brien, J. J., S. C. D., Ry. of St. L., Brighton
O'Brien, T. C., M. M., B. & O., Princess
O'Connor, M. J., M. I., N. Y. C., Phila.
O'Meara, John W., S. S., N. Y., N. H., & H., Chalfonte
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Osman, C. F., Dist. P. A., Reading
Ott, Frank, C. I. I., Iroquois
Pack, A. C., C. I., I. C. C., Atlantic
Page, C. M., S. of F., L. V., Sterling
Palmer, S. I., Asst. R. of E., P.
Pardue, W. J., G. I. P. E., S. A. L., Traymore
Parish, A. I., C. I., M. K. T., Ritz-Carlton
Park, E. A., Supt. M. P. E., P. & P. U., Shelburne
Parke, P., C. E., Pullman Co., Ambassador
Parkinson, H. L., Car Draftsman, M. K. & T., Ritz-Carlton
Patton, C. S., S. M. P., S. A. L., Shelburne
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Peck, W. F., Suprv. A. B., B. & O., Ritz-Carlton
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Petticord, M. V., T. F. A., N. Y. C., New Belmont
Phillips, A. W., M. C. B., S. & O., Knickerbocker
Pilcher, John A., M. E., N. & W., Ritz-Carlton
Plank, L. G., F. A. B., P.
Porcher, Samuel Asst. V. P., Penna., Chalfonte
Power, J. A., S. M. P. & E., S. P., Ambassador
Pownall, W. A., M. E., Wabash, Traymore
Pratt, I. D., G. F. C. D., Penna.
Prendergast, A. P., S. M. P., T. & P., Ritz
Prengle, H. C., Supt., The Mon. Con., Chalfonte
Purcell, Mark, G. A. B. I., N. P.
Pyne, R. A., S. M. P. & C., C. P., Ritz-Carlton
Querry, M. F., G. C. F., N. Y. C. & St. L., Shelburne
Quinlan, W. J., F. on Dem. Loco., D. H., K. of C.
Quinn, Maurice A., M. M., D. L. & W., Strand
Rabbitt, T. G., Ch. Car Acct., Sun Oil Co., Dennis
Rabuck, J. A., M. E., L. & M.
Radford, Earl, Off. Rptr., Ambassador
Ralston, J. A., M. E., Union, Haddon Hall
Raltz, S. J., Asst. M. E., B. & M., Ambassador
Rasbridge, H. B., S. C. D., Reading, Ambassador
Ratcliff, C. V., Shop Supt., C. & O.
Rauschart, E. A., S. M. P., Montour, Shelburne
Reed, James, Dist. M. C. B., N. Y. C Ambassador
Reed, John F., E. H. F., L. I.,
Rees, Harry, M. M., B. & O., Colton Manor
Reid, R. A., M. M., P. M., Keystone
Riefer, P. W., C. E. M. P. & R. S., N. Y. C., Ritz-Carlton
Reisse, J. H., M. A. to V. Pres., C. B. & O., Traymore
Rhodes, C., Supvr. C. R., Erie, Princess
Rhodes, Robt. S., Asst. Engr. Elec. Dept., N. Y. C., Dennis
Rice, Wm. L., S. S., Reading, Dennis
Richards, E. C., S. R. S., M. C., Haddon Hall
Richards, John D., Mach., Reading Co.
Richardson, L., C. M. E., B. & M., Ambassador
Riley, W. E., Ry. Supt., Teem Copper Co., Traymore
Ring, J. M., A. R. A. Insptr., C. N., Marlborough
Ringberg, Emil G., M. E., M. C., Ritz
Rink, G. W., M. E., C. R. R. of N. J., Dennis
Ripley, C. T., Ch. M. E., Pullman Co., Marlborough
Robbins, F. S., S. M. P. & P., F. E. C., Chelsea
Robinson, Michael R., R. I., Penna.
Robinson, W. R., A. R. R. Insp., N. Y. C., Chelsea
Roddie, E. C., S. S., I. C., Craig Hall
Rogers, J. W., Elec. Insptr., Penna.
Root, Jos. J., Jr., Asst. V. P., U. T. C. Co., Ambassador
Ross, Bruce J., Supt., M. S., Penna. T. L., Chelsea
Rossiter, C. A., G. F. C. D., W. T., Runnymede
Russum, T. H., S. C. D., B. & O., Dennis
Safford, L. E., Engr. Combustion Dept., Mich. Central, Traymore
Salisbury, R. W., M. E., T. & P., Ambassador
Sandhas, H. L., G. A. B. & S. H. I., J. C., Lexington
Sandman, A. G., A. to Ch. of M. P. & E., B. & O., Marlborough
Schlafoe, Wm., Past Pres., Strand
Schmoll, Geo. A., Supvr. M. P., B. & O., Marlborough
Schneider, Wm., Frt. Agent, Reading
Schoenly, A. R., Fire Instructor, P. R. R.
Schuyler, A. J., G. C. I., V.
Scott, M. J., M. M., C. P., Ritz-Carlton
Scott, M. J., M. M., C. P., Ritz
Scott, William W., M. M., F. E. C., Sterling
Searles, E. J., Mgr., Schaefer Equip. Co., Dennis
Sechrist, T. O., Asst. S. M. P., L. & N., Marlborough
Seddon, C. W., Supt. M. P & C., D. M. & N., Ambassador
Sederquest, M. M., New Haven, Ambassador
Seiders, I. A., Supt. M. P. & R. E., Reading, Dennis
Seifert, S. P., Mgr. C. D., N. & W., Ritz
Shafer, William E., M. M., S. B. R. R. of C., Penn Atlantic

Shaffer, C. A., G. S. S. M. & T., I. C., Princess
Shaughnessy, T. J., Shop Acct., K. & I. Term., Knickerbocker
Shea, F. J., L. I., I. C. C., Shelburne
Shea, W. B., S. of S., M. P., Ambassador
Sheedy, J. A., Supt. M. P., Penna., Haddon Hall
Sheehy, J. Fred, Pres. & G. M., C. S. Line, Shelburne
Sheppard, Frank C., Reg. Marker, Penna.
Sheppard, M. W., Traf. Mgr., Hercules Powder Co.
Sigwart, H. A., Supvr. C. R. B., M. P., Ambassador
Sillcox, L. K., V. P., N. Y. A. B., Marlborough
Simms, H. A., M. S. C. E., Ry. Ex. Agency, Chalfonte
Simpson, Charles N., Car Insptr, Pure Oil Co., Brighton
Sitterly, W. H., G. C. I., Penn., Marlborough
Slayton, C. H., Mech. Asst., U. P., Monticello
Slayton, F. T., Past S. M. P., V. Monticello
Small, O. M. M., S., Haddon Hall
Smallwood, C. H., G. C. F., I. C., Princess
Smith, A. E., V. P., Union Tank Car, Ambassador
Smith, E. P., Jr., Insptr., C. & O., Traymore
Smith, E. S., M. C. B., F. E. C., Ambassador
Smith, J. J., Supvr. of Shops., B. & O., Marlborough
Smort, George E., Ch. Car Equip., Can. Nat., Marlborough
Snare, G. E., For., P. R. R., Madison
Snyder, H. L., Spl. Rep. G. M., U. P., Haddon Hall
Somborn, Elias A., L. Drafts., N. Y. C., Morton
Sowerby, Frank, Asst. Supt. M. P., C. & P. A. Ry., Continental
Spangler, Charles L., Asst. M. M., Reading, Princess
Spangler, P. F., Gen. Supvr. C. E., Frisco, Ambassador
Spoor, C. E., M. C. B., B. & S., Winslow
Sprague, L. C., Ch. Consul. Engr., C. S. & St. L., Seaside
Staritsky, Paul E., C. E., Soviet Gov't. Ry. Com., Chelsea
Starr, F. A., Supr. of Rec., C. & O., Princess
Starr, J. T., R. F. of E., W. & M., Grand Atlantic
Stevens, M. G., R. H. F., Sou.
Stevenson, F. M., M. E., Penna. T. L., Chelsea
Stohlberger, Philip, M. M., Reading
Storey, J. W., Ch. Draf., C. of G., Arlington
Stremmel, F. H., Asst. to Secy., A. R. A., Ambassador
Stull, Howard W., For. M. S. R., Stanley
Sudbonough, C. B., Asst. V. P., Penna.
Suhrie, N., Fuel Supv. Penna., Penn Atlantic
Sullivan, J. J., S. M. S., N. B. & St. L., Marlborough
Swanson, Frank J., Dist. M. C. B., C. M. St. P. & P., Ambassador
Sweeley, E. A., F. G. Ex. Co., Chelsea
Sweeney, U. L., Acc. to S. M. P., R. F. & P., Knickerbocker
Sylvester, I., S. M. D., C. N., Morton
Tatum, J. J., G. Supt. C. D., B. & O., Chelsea
Taylor, S. O., M. C. B., M. P., Ambassador
Teed, Frank, M. C. B., B. & O., Ritz
Terrell, C. H., Asst. to S. M. P., C. & O., Haddon Hall
Terwilliger, G. E., Supvr. Aux. Eqpt., New Haven, Shelburne
Thill, E. I., Eng. Asst., N. Y. C. R. R., Ritz-Carlton
Thomas, John, G. F. C. R., L. V., Lyric
Thomas, Paul, Genl. R. H. For., Penna.
Thomas, William L., L. Draft., N. Y. C., Morton
Thorn, W. H., M. C. B., C. S. P. M. & O., Ambassador
Tiley, Geo. E., C. E. Supvr. T. C. Eqpt., Gen. Chem. Co., Brighton
Tinder, F. S., Shop Supt., V., Traymore
Tinkler, John E., Asst. Ch. Draft., C. P., Ambassador
Todd, F. M., A. T. M., Penna., Knickerbocker
Townsend, C. L., A. G. P. A., N. P., Ambassador
Trapnell, F. W., C. I. I., Chalfonte
Turner, A. W., Div. M. M., Mich. Cent., Morrison
Tuttle, C. L., M. E., B. & L. E., Haddon Hall
Van Blarcom, W. C., Supt., A. & S. Morton
Voigt, A. E., Car L. Engr., A. T. & S. F., Traymore
Venawine, F. S., C. C. Mech. Dept., T. R. A of St. L., Craig Hall
Venter, H. C., S. of S., S. P., Ambassador
Vittum, J. E., C. J. I., Columbus, Arlington
Voorhees, H. C., V. P., Brighton
Wahlen, John, M. S., M. & W. R., Arlington
Wallace, O. A., S. C. D., A. C. L., Chalfonte
Walsh, F. O., Supt. of M. P., A. & W. P., Marlborough
Walston, J. M., A. Supr. M. P. Ex., Penna.
Warden, H. M. Ch. M. Of., M. K. T., Traymore
Weight, Geo. C., G. C. I., P. R. R., Dennis
Welker, Harvey S., A. R. F. of Engs., Reading
Westacott, C. H., Spl. Mech., P. R. R.
Whisker, C. H., Loco. Engr., C. R. R. of N. J., Princess
Whitaker, H. H., Lead. Draft., N. Y. C.
White, C. M., S. S., A. & L., Shelburne
Whitsitt, W. B., M. E., B. & O., Shelbourne
Wilber, R. W., S. M. P., D. T. & I., Chalfonte
Williams, A. J., Ch. A. B. I., Penna.
Williams, E. V., Supt. M. P., Br. & P., Chalfonte
Williams, J. S., M. M., C. & O., Ritz-Carlton
Willoughby Victor, G. M. E., A. C. & Fdy. Co., Ritz-Carlton
Wingate, Charles L., Yd. Mstr., Penna.
Wink, L. R., A. S. C. D., C. & N. W., Marlborough
Winter, P. G., Spec. Asst., A. R. A., Ambassador
Wintermantel, Walter, Supvr. C. R. B., St. L. Ind. Pk. Co., Princess
Winterrowd, W. H., V. P., Lima Loco. Works, Marlborough
Wintersteen, John, G. M., Cornwall, Marlborough
Withington, Sidney, E. E., N. Y., N. H. & H. R. R., Stevenson
Wolcott, C. F., D. M. C. Ser. Div., A. R. A., Jefferson
Woodruff, R. E., V. P., Erie, Ritz
Worman, H. L., S. M. P., Frisco, Traymore
Wright, B. E., G. F. C. D., N. Y. C., Shelburne
Wright Roy V., Mng. Editor, Railway Age, Dennis
Wyle, Bruce, Asst. Elec. Supr., Reading, Ambassador
Yergy, H. I., Asst. Genl. For., Penna., Penn Alto
Yingling, W. J., M. M., N. & W., Ritz
Yoder, Arthur W., B. I., Reading
Young, W. H., Asst. Sup., P. R. R., Lafayette
Zbeibel, C. A., G. F. C. D., L. & N., Ambassador
Zerr, Wm. L., Trav. For., Reading, Sage

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Anderson, H. A., A. P. A., Penna., Chalfonte
Bell, Orren R., S. For., C. R. R. of N. J., Strath Haven
Boyce, Warren, Stockman, C. R. R. of N. J., Strath Haven
Cherry, Chas. P., Genl. Mtl. Supvr., Penna., Jefferson
Cook, E. B., S. S. P. & S., C. R. R. of N. J., Jefferson
Cooley, L. R., Trav. Stkr., C. R. R. of N. J., Haddon Hall
Cooper, W. Haco, Retired, Div. S. K., Reading
Coston, Harry F., Sec. to Mgr. P. & S., C. R. R. Co. of N. J., Ritz-Carlton
Crane, James F., S. K., Reading
Doole, Thomas, Req. Marker, Penna.
Elder, S. M., Lumber Agt., B. & O., Strand
Fisher, Clarence E., C. P. A. O., P. R. R.
Foltz, Frank G., Delivery Pur. Dept., Penna.
Forsuck, J. Walter, Rpr. S. K., P., Lexington
Frazee, W. H., Supvr., Penna.
Freet, C. T., Genl. Mtl. Supvr., Penna., Morton
Griswold, W. W., P. A., W. & L. E., Ambassador
Hagerty, J. W., Genl. Supvr., Penna., Chelsea
Hanlon, F. J., S. K., Penna., De Ville
Hargrave, John, Clerk, Penna.
Hargrave, Wm., Secy. to P. A., Penna., Chelsea
Hart, Eugene M., M. S. C., C. R. R. of N. J., Strath Haven
Hughes, W. M., S. K., B. E. & P., Seaside
Jones, M. G., S. K., P.
Kinnear, C. W., Asst. Gen. S. K., P. R. R., Chalfont
Kreglow, A. F., S. K., W. T., Chalfonte
Kroesen, Franklin I., Req'n Marker, Penna., Traymore
Krug, Harry E., Bureau Head Stores, Reading
Lamnook, E. J., Fuel Pur. Agt., P. R. R., Chelsea
Landis, J. D., P. A., Reading
Lehrsch, G. H., S. K., P.
Leversidge, R. M., Asst. P. A., L. & N. E.
Lewis, P. C., P. A. Office, Penna.
Livingston, W. C., S. K., P. R. R., Osborne
Lockhart, H. A., Div. S. K., B. & O. C. T., Haddon Hall
Long, R. D., Asst. G. S. K., C. B. & O., Ambassador
Loos, Llewllyn K., Gen. F. Gen. S. Dept., Reading
MacDonald, A. S., Dist. S. K., C. P., Marlborough
MacDonald, John A., G. S. Acct., B. & B., Chalfonte
Manion, S. R., S. K., P., Breakers
Mann, A. C., V. P., I. C., Ritz
Mann, C. A., Req. Marker, Penna.
Marshall, C. A., Div. S. K., C. R. R. of N. J., Jefferson
Mast, Carl H., Acct. S. D., Reading, Bon Air
Maunz, C. F., S. K., D. T. S. L., Princess
Mayer, Peter C., Asst. to P. A., I. C., Traymore
McAuliffe, J. W., Clerk Pur. Dept., P.
McCann, Thomas, Div. S. K., Reading, Underwood Apts.
McCormick, Joseph F., Opr. Clk. G. S., Reading, Elberon
McDonald, N. J., Sales Clerk, P. A., Penna., Penn Atlantic
McGill, L. W., Clk. Acc. Dept., P. R. R.
McGlothlin, J. H., G. S. K., V., Marlborough
McGrath, Frank, T. S. K., B. & M., Chalfonte
McIlvaine, C. L., Asst. P. A., Penna., Brighton
McKee, Eugene J., Req. Marker, Penna.
McKeown, Thos M., A. G. P. A., C. P., Traymore
McKinnon, J. J., S. K., B. & M., Chalfonte
McMichol, Bernard, Stkr., Reading, Princess
McQuilkin, H. P., Asst. P. A., B. & O., Haddon Hall
Melcaard, B. B., Asst. to P. A., C. M., St. P. & P., Traymore
Mellor, H. N., Commissary Buyer, Penna. Knickerbocker
Meyers, Samuel, G. S. K., L. & H., Chalfonte
Mick, Fred H., Clerk, P. R. R., Jefferson
Miller, J. V., Asst. G. S. K., C., M. & St. P., Shelburne
Miller, W. J., S. K., P.
Mills, O. B., Asst. to G. S. K., P. R. R., Chalfonte
Moffatt, W. C., G. S. K., D. & H., New Clarion
Mohr, H., S. K., Reading
Monroe, E. T., G. P. A., B. R. & P., Traymore
Montgomery, S. A., Asst. to P. A., Penna., Penn Atlantic
Moore, H. H., Req. Marker P. & S., Penna.
Morris, H. M., Asst., P. A., W. & L. E., Ambassador
Morris, Wm. H., G. S. K., Reading, Madison
Morrison, N. B., S. K., F. G. E.
Munster, A. W., P. A., B. & M., Chalfonte
Murphy, F. A., Dist. S. K., B. & O., President
Myers, R. C., S. K., Monongahela, Shelburne
Nash, C. L., G. S. K., F. G., Princess
Nelson, O., G. S. K., U. P., Ambassador
Nicodemus, E. H., Gen. Mtl. Supr., P. R. R., Runnymede
Niehaus, Wm. F., C. C. to P. A., M. K. & R. R. Co., Ritz-Carlton
Nogel, Max A., Acct. P. & S., P. R. R.
O'Dea, J. T., Asst. to Pres. & P. A., P. P. W., Ambassador
Oldenbuttel, N. V., Asst G. S. K., A. C. L., Haddon Hall
Orndorff, J. R., Supvr. of Mat., B. & O., Shelburne
Otto, E. G., Secy. to G. P. A., Penna.
Owen, A. E., A. P. A., Penna., Traymore
Painter, C. R., P. A., N. Y. N. H. & H., Traymore
Palsgrove, Chas. S., Dist. S. K., C. & N. W., Traymore
Paulk, R. F., A. S. K., A. C. L., Princess
Pearce, H. C., Dir. P. & S., C. & O., Haddon Hall
Pearson, L. G., Dist. S. K., S. P., Princess
Peterson, E. W., G. S. K., Bangor & Aroostook, Traymore
Pollard, Arthur P., Trav. S. K., B. & M., Chalfonte
Porcher, Samuel, Ret. Asst. V. P., Penna., Chalfonte
Portlock, P. A., Sal., Dennis
Preston, C. F., G. S. K., C. V., Madison
Rainie, H. M., Asst. to P. A., B. & M., Chalfonte
Rank, G. G., Req. Marker, Penna.
Rapp, Herbert M., B. H., Reading, Bon Aire
Rayer, A. C., Req. Marker, P.
Reed, Frank, V. P., C. R. & P., Ambassador
Remaley, F. H., Div. S. K., B. & O., Haddon Hall
Renthineer, Carl, Stat. S. K., M. K. T., Ritz
Ressor, C. K., Asst. Mgr. of Stores, Erie, Strand
Reynolds, F. W., Dist. S. K., B. & O., Princess
Robertson, D., Asst. G. S. K., C. N., Chalfonte
Rock, D. E., S. K., P., Runnymede
Rolston, H. W., Stat., P., Chelsea
Rooney, C. E., P. A., D. T. & I., Ambassador
Ryan, T. H., Asst. P. A., Wabash R. R., Ritz
Sarvas, Peter D., Fore. Stores, Reading
Schaefer, C. L., F. S. D., Penna.
Schmehl, Wilson H., A. S. K., Reading
Schneider, J. J., P. A., Merc. Dsptch., Ambassador
Schneider, Laurence, Req. Marker, P. R. R.

(Continued on Page 1454D138)

Car Department Problems Discussed at Second Day's Session

Meeting featured by W. P. Borland's address, individual paper by R. L. Kleine and important committee reports

THE second session of the 11th annual meeting of the Mechanical Division at the Municipal Auditorium Thursday morning listened to an address by W. P. Borland, chief of the Bureau of Safety, Interstate Commerce Commission, which clearly set forth the purpose underlying the work of the bureau and paid a fine tribute to the genius of Mr. Moseley, for many years secretary of the commission, who was largely responsible for the character of the Safety Appliance Acts. Mr. Borland's address was followed by a paper by R. L. Kleine on an important development in car inspection methods.

The division then took up a heavy program of important car reports.

Work of the Bureau of Safety

Purpose of safety appliance laws the prevention of casualties, not the collection of penalties

By W. P. Borland
Director Bureau of Safety

W. P. Borland
Chairman

Of late years we have experienced a distinct change of attitude on the part of most railway managers towards the question of government regulation; government requirements and agencies that were formerly opposed are now welcomed and aided. I attribute this change of attitude, in great measure, to the necessarily close contacts that were set up and maintained between railroad and government representatives during the war period. When the government took over the roads in that great national crisis we pooled our energies, our knowledge, and our resources, for the purpose of getting the best possible results from the operation of our transportation system. There was close cooperation throughout between railroad and government representatives; they looked at their problems with a single eye, and no questions of policy nor theories of management were permitted to obscure the fact that they were working together to win the war.

What Mr. Aishton Has Accomplished

The psychology created by that situation, and those close contacts, permeated the railroad organization throughout; railroad managers and executives awoke to a realization of the fact that government regulation was not such a drag upon efficient and economical operation as it had been supposed to be, but on the contrary, might be of distinct benefit to the roads when properly directed and utilized. This change of attitude led to a reorganization of the American Railway Association after the roads were returned to their owners, and the selection of a man as its president to whom a debt of gratitude is due for bringing the railroads and the government agencies charged with their regulation into close and friendly relations for the attainment of safety and efficiency in railroad operation. I do not believe it is an overstatement to say that our present era of good feeling is almost wholly due to the work of Mr. Aishton. His large experience, broad vision, and wise counsel, aided by his thorough understanding of men and sympathy with their problems, has enabled him to render invaluable service to the railroads and to the public as well.

As Director of the Commission's Bureau of Safety

it is my job to see that certain requirements of law relating to car equipment are complied with. It is one of the numerous jobs of members of this Mechanical Division to see that cars are equipped as the law directs in the first instance, and that the equipment thereafter is kept in such condition that I shall not have reason to find fault with it. That is the point of contact between the Bureau of Safety and individual members of this division; it will be apparent, as a practical matter, that at that point of contact we are seeking for the attainment of a common purpose, and it is highly important that we work together, with an understanding, as complete as may be, of one another's problems and points of view. It has been my pleasure to meet, and confer with members of this division and its efficient secretary from time to time, either personally or by representative, on matters relating to car equipment, and whatever differences have arisen between us have always been ironed out and settled amicably.

The Safety Appliance Acts

The original Safety Appliance Law was enacted in 1893, and became effective on August first 1900; there was an amended act in 1903, and a supplemental act in 1910. We have now had thirty years' experience with this legislation, and it will not be inappropriate to make brief mention of a few outstanding results that have been accomplished in securing the objects of the law within this period. The percentage of equipment defects reported to the bureau last year was the lowest in the history of the law, and the condition of equipment generally was noted as better than at any other period in our experience. This improved condition of equipment has a direct bearing on the record of casualties to employes which it is the purpose of the law to prevent as far as possible.

It is no secret that the passage of this legislation was vigorously opposed by the railroads. Before the passage of the original law, following the recommendations of the Master Car Builders' Association, the roads had already adopted a standard type of automatic car coupler, established standards of car equipment for the protection of trainmen, and were equipping freight cars with air brakes as rapidly as their finances would permit. Under such circumstances the railroad managers quite naturally felt that they should be left free to work out their problems of safety without governmental interference, and they strongly resented legal pressure designed to force the accomplishment of measures already under way. The opposition of the railroads referred almost entirely to the principle of the legislation, and not at all to its object.

When I came to the Commission, twenty-seven years ago, the law was in its infancy; its various provisions had not yet been interpreted by the courts, and administrative policies and methods were still in process of trial and growth.

It was a fortunate circumstance that the work of administration was placed in charge of the man who originated the law, and who was almost wholly responsible for its enactment, Edward A. Moseley, secretary of the Interstate Commerce Commission from the time of its creation in 1887 to the date of his death in 1911.

Mr. Moseley was one of those rare individuals of whom the world sees all too few; a real humanitarian with a large equipment of practical common sense, and not overpowered by the weight of his own ideas. He was a man of independent fortune, and he had no political ambition to serve. He had a keen and accurate sense of justice, and great sympathy for those upon whom conditions of life pressed harshly because of maladjustments for which they were blameless. He sought to create a better environment for the workingman by removing legal disabilities surrounding him and widening his horizon of legal right. The social legislation that may be placed to his credit includes the following: The Safety Appliance Acts, the Accident Reports Act, the Hours of Service Law, The Employers Liability Law, The Medals of Honor Act, and the Erdman Arbitration Act. He personally originated all those laws, and they were placed upon the statute books by reason of his persistent activity in their behalf.

A Tribute to the Late Edward A. Moseley

I was highly honored in being closely associated with Mr. Moseley in his work for eight years previous to his death. I enjoyed his confidence and friendship to a high degree, and I make no apology for taking this opportunity to pay my tribute of love and respect to his memory. I regard it as particularly appropriate that Mr. Moseley's name should be recalled in this company, because the members of the Mechanical Division, as well as the public, and the railroad employes for whom he laid down his life, are in some measure the beneficiaries of his life work. In the hurry and turmoil of this material age we are all of us too prone to forget our obligations, and our duties to our fellow men.

Mr. Moseley's desire was to make full use of the good work that had been done by the Master Car Builders' Association, and he sought to give the standards of that association for the protection of trainmen the force of law. At his suggestion President Roosevelt, by executive order, placed the M.C.B. standards in force in the Panama Canal Zone.

In his administration of the law his entire lack of partisanship soon brought him into conflict with the legislative representative of the train service brotherhoods. During the years of agitation preceding the passage of the law Mr. Moseley received little direct aid or encouragement from the employes or their representatives, but as soon as the law became effective they had their man down in Washington, and he took it upon himself to speak for the employes and sought to dictate the manner in which the law should be administered. Mr. Fuller was a man of considerable ability; he was a tireless worker, and was entirely devoted to the interests of the employes he represented. But he expected more from the law than was consistent with the transitory conditions prevailing in that early administrative stage. He was for drastic enforcement of the letter of the law, and he criticized Moseley severely for his failure rigidly to enforce certain of its provisions. He was particularly hostile towards Mr. Moseley's endorsement of the M.C.B. standards for the protection of trainmen. He protested the Panama Railway order, and was strongly in opposition to the passage of the supplemental act, on the ground that it was simply an indirect way of legalizing the M.C.B. standards.

Notwithstanding this protest the bill was passed, and if the employes for whom Mr. Fuller spoke have had any cause to regret its passage I have not heard of it.

The order of March 13, 1911, which resulted from the passage of this law, is based almost entirely upon the M.C.B. standards. It has now been in force for a period of nearly twenty years, and during all that time there has been but one request for its modification. That request came less than a year ago, and was not based upon any question of dissatisfaction with the terms of the order covering the item to which it referred, but pertained wholly to a question of material and had its origin in commercial considerations. I think this is a record to which we may well point with pride.

The Reductions in Casualties

As to the results obtained in securing the purpose of the law, I want to refer briefly to statistics: In the year 1900 265 trainmen were killed and 5,067 injured in coupling accidents, while in 1929 the coupling accidents to trainmen resulted in 59 deaths and 965 injuries. This comparison fails to tell the whole story, as the number of trainmen exposed to risk in 1929 was almost double the 1900 figure, there being 314,404 trainmen employed in 1929 as against 191,198 in 1900. The low ratio of coupling casualties shown by the 1929 figures may be said to represent the occupational risk, as the reduction from year to year since 1900 has been practically constant.

The number of trainmen killed by falling from trains and engines in 1900 was 457 and the number injured 3,860. It is not possible to make an exact comparison of this hazard between the two periods selected, as "falling from trains and engines" is no longer a major classification in the statistical reports of the Commission. Code number 7060 in the Commission's accident bulletin refers to "falling from locomotives or cars not otherwise classified." In the last published bulletin trainmen on duty under this classification to the number of 90 were reported killed and 460 injured. That is the nearest comparison than can be made with the 1900 figures. There can be no doubt that there has been a great decrease in the number of casualties of this kind, due to the practically universal control of trains by means of air brakes.

Other matters relating to safety in operation, not so directly related to factors covered by the law, may be mentioned. The record of collisions shows vast improvement. The number of collisions reported in 1901, which is the first year for which we have a complete record, was 5,042, resulting in the death of 130 passengers and 366 trainmen, and the injury of 2,298 passengers and 2,456 trainmen. In 1929 the number of collisions reported was 4,435. In these collisions only 1 passenger was reported killed and 513 injured; the corresponding figures for trainmen on duty were 76 killed and 421 injured.

Derailments Have Increased

The record for derailments is not so good. It is notable that while the number of collisions has decreased from year to year, notwithstanding the greater number of train units and train miles, the number of derailments has constantly increased. The number of derailments in 1901 was 3,633, as compared with 5,042 collisions, while in 1929 the derailments numbered 9,871 as compared with 4,435 collisions. In 1901 derailments were responsible for the death of 37 passengers and 193 trainmen, and the injury of 1,194 passengers and 1,040 trainmen. In 1929 the passengers killed in derailments numbered 35 and the number injured 1,202. The corresponding figures for trainmen were 63 killed and 495 injured.

Of course, comparisons of this nature, taken by themselves, are not at all conclusive. They tell us nothing about the trend during the thirty-year period, and only show conclusively that casualties of the nature dealt with were fewer in 1929 than in 1900, notwithstanding an enormous increase in the number of equipment units and train units, and the greater number of persons at risk. The fact that only one passenger was killed in collisions last year as against 130 killed in 1901 tells us only that 1929 was the safer year as respects that class of accidents; it tells us nothing about what happened in between, and furnishes no assurance that the year 1930 may not exceed the year 1901 in the number of casualties of this class. There is every probability against it, however, as by common observation we know that in all respects pertaining to train operation conditions are much improved, and the casualty rate upon railroads has been enormously reduced.

Factors Affecting Interpretation of Statistical Results

Factors that have a direct relation to questions of safety are the following: The number of railway employes in 1900 was 1,017, 653; in 1929 the number had increased to 1,686,769. The number of trainmen increased from 191,198 to 314,404. The number of freight cars increased from 1,365,531 to 2,465,625; passenger cars increased from 34,713 to 54,800, and locomotives from 37,663 to 63,311. In 1900 the railroads carried 1,101,680,238 tons of freight; tons carried one mile numbered 141,599,157,270. The corresponding figures for 1929 are 2,427,465,000 and 447,260,229,000, more than double the number of tons carried and nearly four times the number of tons carried one mile.

This increase in freight business is about what would naturally be expected from the growth of population and business activity. When we look at the figures relating to passenger traffic, however, knowing, as we do, that people are traveling more extensively now than ever before, it is rather startling to note the extent to which they have abandoned the railroads as a means of conveyance. In 1900 the railroads carried 576,865,250 passengers; the number carried one mile was 16,139,007,217. In 1929 the number of passengers carried was but 448,187,000, and the number carried one mile 6,786,927,000; more than one hundred million fewer passengers carried, and nearly ten billion fewer carried one mile! A significant indication of the remarkable change that has taken place in the character of our passenger business in the past thirty years appears from the fact that in 1900 the roads used 34,713 passenger cars to move more than sixteen billion passengers one mile, while in 1929 they used 54,800 cars to move six billion passengers one mile. More than one hundred million fewer passengers to ride, and twenty thousand more cars for them to ride in! It looks like the roads were catering altogether to high class travel and neglecting the common people.

Crossing Accidents a Social Responsibility

Due to the revolution in our modes of travel another serious danger has arisen to plague us. While casualties to railway employes and passengers have greatly decreased, due to better attention given to the condition of equipment and the admirable educational work of our safety committees, the casualties at highway grade crossings have enormously increased in number. In the year 1900 there were 729 persons killed and 1,294 injured at highway grade crossings, while in 1929 the number killed was 2,485 and the number injured 6,804. This mounting list of deaths and injuries, although it bears heavily upon the railroads, is something more than a railroad problem. It is not a problem of the railroads' making, and its elements are almost wholly removed from any measure of control that could be imposed upon them by the railroad organization's methods of discipline. It is a social problem, created by a radical change in methods of transportation that have worked injury to the railroads. Responsibility for this dangerous condition rests upon society as a whole, and until society frankly accepts its responsibility and takes proper measures to safeguard

its members little improvement can be hoped for.

In dwelling upon this condition of increased safety in railway travel and employment I would not wish you to assume that I am giving undue credit to the law and its administration by the Bureau of Safety. It is true that the bureau has played an important part in bringing about safer conditions, but its work has only fitted into and supplemented a much more important activity that has been carried on by railroad agencies. Without the splendid educational work of the railroad safety organizations we would have a much less favorable story to tell. The slogan "safety first" has created a new psychology among railway employes, and the safety committees, by constant admonition and personal example, have performed a work in the conservation of human life that cannot be too highly commended.

The bureau has tried to follow the Moseley policy of administration, which sought to be helpful and suggestive rather than antagonistic and penalty seeking, and we have never brought suit against any railroad until after conditions complained of had been brought to the attention of its management and full opportunity given to correct them. Our inspectors are instructed that the whole purpose of the law is to conserve human life and protect employes from injury, and not the collection of penalties. The efficiency of an inspector is not judged by the number of violations or reports of defects he turns in, but on the contrary a lack of such reports is taken as a favorable condition, as it indicates that the law and the rules are being properly observed.

Discussion

Chairman Smart: We all appreciate the splendid address Mr. Borland has given us this morning and it is very encouraging to know that the Interstate Commerce Commission appreciates what this association is doing with regard to safety in the handling of passengers and employees on the railways. We have a good number of the Bureau of Safety inspectors here this morning and, as I stated on the first morning, we welcome them in any discussion on any of the papers that are put before us at any one of these meetings.

Report of Committee on Nominations

A. R. Ayers for chairman——O. S. Jackson for vice-chairman ——G. A. Moriarty, a new name on general committee

The terms of office of the chairman, vice-chairman and seven members of the General Committee expire in June, 1930.

In accordance with Section 7 (a) of the rules of order of the Division which provides that officers of the Division shall be elected at the regular meeting of the Division held in June of each even year, your committee nominates the following for the offices of chairman and vice-chairman:

For Chairman—Term expiring June, 1932; A. R. Ayers, general manager, New York, Chicago and St. Louis.

For Vice-Chairman—Term expiring June, 1932: O. S. Jackson, general superintendent motive power and machinery, Union Pacific System.

As the terms of seven members of the General Committee expire in June, 1930, your Committee nominates the following to serve until June, 1932, as members of the General Committee: C. E. Chambers, superintendent motive power and equipment, Central Railroad of New Jersey; C. J. Bodemer, superintendent machinery, Louisville & Nashville; E. B. Hall, general superintendent motive power and machinery, Chicago & North Western; F. R. Mays, general superintendent motive power, Illinois Central; O. A. Garber, chief mechanical officer, Missouri Pacific; John Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe; R. L. Kleine, assistant chief of motive power, Pennsylvania.

Your committee also nominates G. A. Moriarty, general mechanical superintendent, New York, New Haven & Hartford, to fill the vacancy on account of the resignation of W. L. Bean, whose term does not expire until June, 1931.

Your committee also nominates G. E. Smart, chief of car equipment, Canadian National, to fill the vacancy on account of O. S. Jackson being nominated for vice-chairman, term expiring June, 1931.

The report was signed by F. W. Brazier (chairman), assistant to general superintendent motive power and rolling stock, New York Central; T. W. Demarest, general superintendent motive power, Western Region Pennsylvania; C. E. Chambers, superintendent motive power and equipment, Central Railroad of New Jersey; J. J. Hennessey, assistant master car builder, Chicago, Milwaukee, St. Paul & Pacific; J. Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe.

Discussion

Chairman Smart: It will be in order to have this report accepted and referred to ballot on the last day of the convention. (*Motion to that effect was made and carried.*)

Freight-Car Inspection Pit

Use of new Inspection facility results in the detection of 503 defects, not ordinarily visible in a 64-day period

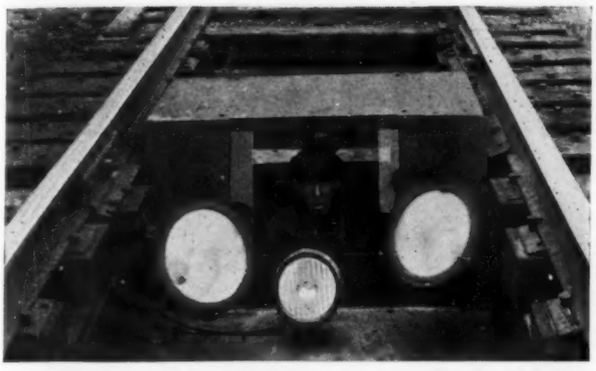
By R. L. Kleine
Assistant Chief of Motive Power, Pennsylvania

The increasing importance of elimination of train delays, due to car failures, as well as cutting down to a minimum accidents resulting from defective car parts, makes a closer inspection of freight cars in terminals an absolute necessity.

A study of this subject developed that there are certain vital details of the equipment not readily visible to the ordinary inspection which led the Pennsylvania to design and install during November, 1929, an inspection pit in the eastbound receiving yard at Altoona, Pa., at the approach of the hump, for the purpose of enabling an inspection to be made of the underside of the trucks, brake arrangement, draft attachments, and underframe, while the cars are being classified over the hump with the draft of cars moving at a speed of two miles an hour, and without interference with the normal movement of the cars over the hump. This pit is an innovation in railroad practice, in that an inspector so located is able to detect practically all defects that are not visible to the ordinary ground inspection.

The table shown on the following page gives a list of defects detected by this pit inspection.

In a period of 64 days, covering 82,000 cars, or an average of about 1,280 cars per day. An analysis of this statement shows the following: (a) A total of 987 defects discovered by the pit inspection during the period, or 15 per day; (b) Approximately 60 per cent of the defects detected were not visible to the ordinary inspection; (c) 174 defects detected might have developed into potential accidents, which include 102 cracked arch bars, 15 missing box bolt nuts, 11 missing column bolt nuts, 1 broken column bolt and 9 broken brake hangers.



Location of the Freight-Car Inspection Pit in the Track

Added Inspection Produces Results

From the beginning of the operation of the pit, it has been apparent that the added inspection is producing the hoped for results. Cracked arch bars, bent and cracked center sills, loose wheels and other defects in trucks, and brake and draft attachments, not visible to ordinary yard ground inspection have been detected. The discovery of defects of such character attests the value of this method of inspection.

In addition, it has been noticed that since the inception of this underneath inspection, there has been a general tightening up of the inspection in the receiving yards, and more attention is being paid to the underneath parts of the car.

The results speak for themselves. While it is almost impossible to estimate the value of this pit inspection in terms of dollars and cents, there is no question but that the need for it has been definitely established. Many defects that would otherwise go undetected are caught and repaired before leaving the terminal, thus preventing delays and damage on the road.

The pit installed at Altoona was constructed of cribbing. Inside length 8 ft., height 5 ft., and width 4 ft., corresponding to distance between rails. The roof, with a hood 2 ft. high, extending to within one inch of the top of the rail, is of steel frame and plate construction to insure the safety of the inspector in the pit. On both of the sloping sides of the steel hood, facing up and down the track, openings 24 in. by 17 in. were cut to provide the lookout for the inspector. A sliding sash is provided equipped with shatter-proof glass to close the lookout when cars are not passing over the pit.

The matter of lighting facilities was thoroughly investigated and it was decided that it would be necessary to provide three lights in each direction to properly illuminate the underneath parts of the cars as they passed over the pit. Two flood lights of 200-watt capacity each were placed in a stationary position, one on each side, inside the rail, focused about the wheel fit on the opposite side from the light. The third light, a portable one of 100-watt capacity, similar in power to an ordinary automobile headlight, was placed in the center, with an added feature making it possible by the use of an extension to throw the beam of light to any part underneath the car.

With the inspector seated on a stool of a height that permits him to view the car trucks from almost the level of the roadbed, it is possible to inspect first the front portion underneath the car and then by turning to view the rear portion as it passes over the pit.

How Defective Cars Are Marked

Upon observing a defect that can be repaired in the advance yard without shopping the car, the inspector by means of a whitewash spraying device marks the truck on the south side. If the defect makes it necessary to send the car to the repair shop, the truck on the north side is sprayed. In the latter case, the inspector also presses a push button that operates an electric bell in the conductor's room at the apex of the hump, about 300 ft. from the inspection pit. This bell indicates to the conductor that a car is to be cut out for the shop track and he has sufficient time to give warning to look for spray mark on truck on north side of car, so that the car cutter can train the car to the shop track. The spraying device on each side of the track consists of a nozzle extending 18 in. above the ground through which whitewash from a small tank is sprayed by air pressure against the rear truck of the car. The spraying nozzles are located about 8 feet from the inspection pit, so that the inspector has ample time to spray the truck of the car which is moving at a speed of two miles an hour over the hump.

To insure that cars sprayed on the south side of the truck for attention in the advance yard receive the necessary repairs, the inspector in the pit makes a note of the defect. He cannot give the car number, but the inspectors in the advance yard are

Results of Inspection at Altoona Freight-Car Inspection Pit.

Defects visible in ordinary inspection	64 Days Nov. 16, 1929, to Jan. 18, 1930, incl.
Wheels—cracked tread	†7*
Wheels—seamy tread	4*
Missing brake hanger nut	1
Missing brake shaft cotter	6
Missing brake clevis cotter	3
Missing underconnecter cotter	58
Missing box nut	†15
Missing brake shoe key	† 1
Loose yoke rivets	9
Missing column nut	†11
Broken column bolt	† 1
Wheels broken rim	9
Slope short cut on axle	5
Missing brake lever cotter	2
Broken carrier iron	56
Cracked truck bolster	5
Missing brake bearing nut	1
Missing carrier iron nut	17
Broken knuckle pin	8
Defective center sills	58
Wheels loose	† 9*
Broken brake beam	15
Wheels slid flat	15*
Broken brake rod	82*
Missing brake key bolt	32
Missing reservoir bolt	2
Broken tie strap rivets	12
Broken coupler cross key	† 1
Broken yoke strap	† 9
Missing lever rest pin	6
Missing brake bow nut	4
Missing brake rod	2
Broken brake hanger	† 9
Broken coupler	† 9
Total	484

NOTE: *Not visible under certain conditions. †Potential accidents—72.

Defects not visible to ordinary inspection	
Bent and broken drop door roller shafts and castings	53
Cracked arch bars	†102
Missing drop door pin	2
Missing brake cotters	101
Broken brake equalizers	13
Missing drop door reach arm nut	1
Broken follower plate	16
Broken draft stops	73
Missing door clevis cotter	85
Missing brake equalizer pin	2
Broken and cracked spring plank	54
Cracked top center plate	1
Total	503

NOTE: †Potential accidents—102.

Summary

484	Defects visible in ordinary inspection.
503	Defects not visible in ordinary inspection.
987	Total defects discovered with pit.
7.6	Daily average visible defects.
7.9	Daily average not visible defects.
15.5	Total daily average defects discovered with pit.

Application of the Whitewash Spray on the Side of the Truck of a Car on which the Defect Has Been Detected

required to keep a record of the defects repaired, giving the car number. This report is matched with the pit inspector's report of defects for each 25-hr. period. The cars received in the eastbound car repair shop with whitewash marks on north side truck have the repairs recorded, and this record is also matched with that of the pit inspector.

Since the experimental installation at Altoona, a standard pit assembly has been developed, the details having been modified to simplify the arrangement of valves, piping, etc., and designs developed for passage ways and inspection pit proper, in separate concrete units, that may be made at one place and transported and installed at such locations as may be selected, or transferred from one location to another at minimum expense.

The Pennsylvania contemplates extending on a system basis the pit inspection to supplement the regular receiving yard inspection. It is to be understood, of course, that it is not proposed to pass cars trained in a given direction over pits in each classification yard through which they pass, but rather that the pits shall be so located as to catch the cars but once during their through movement over the Pennsylvania.

The ideal arrangement would be to locate the inspection pit at the entrance to the receiving yard, and make the complete inspection of the sides, top and underneath at one time by installing suitable lighting facilities for the side and top inspection. As it is not practicable to make a satisfactory inspection with the cars moving at a speed greater than two miles per hour, the installation of such an inspection is dependent upon the ability to control the movement of the road train at two miles per hour upon entering the yard from the standpoint of density of traffic, grades, etc. The Pennsylvania has under consideration the installation of one of these inspection stations at the entrance of a receiving yard.

Discussion

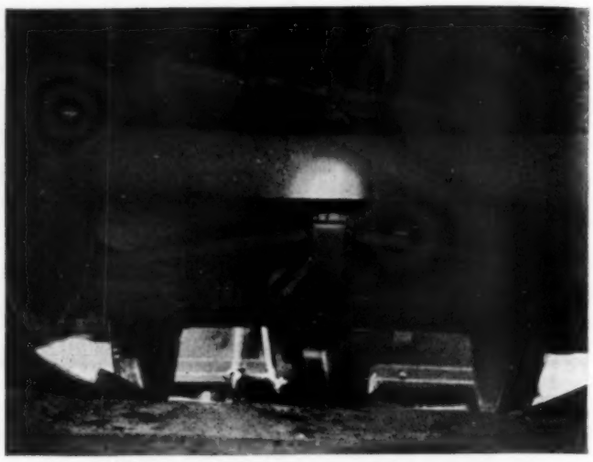
A. H. Fetters (U. P.): I would like to ask Mr. Kleine if he has available for release at this time any indication of the cost of such a pit, and also what he does, if anything, in removing the whitewash indication after the car has received repairs.

Mr. Kleine: The concrete pit illustrated, if installed as an individual unit in the track, we estimate will cost about $1,800 for a single installation, or about $2,800 for a double track installation.

Insofar as removing whitewash marks, it is not necessary. We don't clean them off as they will soon be obliterated in service.

J. J. Tatum (B. & O.): A number of roads make thorough inspection of their equipment. If a car is properly inspected before it is loaded, or received from a connecting line, standing still and exercising every possible effort to discover defects that might exist, you would get from such inspection about as safe a car as is possible, unless you dissect the car and make a new inspection of each individual part.

Entrance to the Pit is through a Passageway Built in the Side of the Hump Elevation



Car Passing Over the Pit—Lighting Effect on the Underside of the Car Structure

On the Baltimore & Ohio we have what is called an inspection at the originating point. That inspection requires an inspector at dark places where he does not get the full effects of the daylight to use an acetylene light to throw a white light upon each individual part of the car. He is required to tap the truck with an inspector's hammer for loosening up rust and uncovering flaws that might exist in the side frame or arch bar. This is also true of wheels, axles, and of other parts of the car, such as draft gears, center plates and side bearing clearances.

After he has made this inspection he is required to place on the side of the car—each inspector on the side he inspects—what is known as a certification card. That card certifies that "John Smith" has inspected this car and that it is in a safe condition to go to destination. Should anything happen to that car en route caused by neglect due to an old defect, that card is lifted and sent to the office of the general superintendent of the car department, who immediately institutes an investigation as to why that inspector certified that the car was in perfect condition when he allowed it to leave his hands.

Further, an investigation is immediately made to establish if that man received the proper examination for an inspector, and whether he earned at least 85 per cent in such examination.

Mr. Kleine: I thought our inspection on the Pennsylvania was pretty close. We have had super-inspectors out. We had inspectors with mirrors to detect cracked arch bars, and we also made the inspection when the individual car was standing still for loading, which is a certificate inspection, but where you have one certificate inspection you have ten inspections in the car moving from receiving yard to receiving yard.

All of these cars were yarded. They were gone over by the inspectors and repair men before being sent over the pit. These inspectors knew the cars were to move over the pit and that any defects found at the pit would be their responsibility. Notwithstanding that, we found in 82,000 cars which were inspected in the period of 64 days, an average daily of 15.5 defects discovered by the pit inspection after the recieving yard inspection.

Arch bars were found cracked on the inside of the column bolt. The only way to discover them from the

side inspection is by a mirror, and you do not have time to mirror all arch bar trucks that go through the receiving yard. There was an average of almost two cars a day with cracked arch bars, which are sources of potential accidents.

Mr. Tatum: Were tests made on standing inspection? When a car is inspected standing it is not inspected on the outside or inside only. It is inspected all over.

No one can inspect a car moving at a speed of two miles an hour as well as if it is standing still.

Mr. Kleine: I regret it if I did not make clear that the inspection prior to the pit inspection was a standing one. All the cars that were inspected prior to the pit inspection received a standard inspection.

H. E. Myers (L. V.): I would like to ask Mr. Kleine if in making this pit inspection he has been able to reduce the number of inspectors previously employed. He made the statement that the cars previously had been given a standing inspetion, and the thought just run in my mind as to whether or not it is possible to reduce the number of inspectors.

Mr. Kleine: We took one man from the receiving yard inspection force and placed him in the pit. We did not replace that man in the receiving yard, which is a large yard and has a good many inspectors in it. That is a condition depending on how rapidly or how many units you have in operation and how much time you can take to slow the trains entering the receiving yard. If that can be done, the thought would be to do away with the receiving yard inspection and concentrate it on the incoming end of the receiving yard.

John Purcell (A. T. & S .F.): I move that we give Mr. Kleine a rising vote of thanks for this paper. Inside of a few years every railroad of the country is going to be equipped with these pits.

(*The motion was seconded and carried.*)

Report of the Arbitration Committee

Regulations for recording and billing transferred to manual ——Wood cars in interchange until January 1, 1933

T. W. Demarest
Chairman

During the year Cases 1632 to 1655, inclusive, have been decided and copies sent to the members. A copy of these decisions is made part of this report. A vote of concurrence in the decisions is respectfully requested by the committee.

Attention is again called to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange unless submitted in the form of Arbitration Cases as per Rule 123.

Freight Car Rules

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Preface

The committee recommends that last paragraph of Preface to the interchange Rules be modified, as follows:

Proposed Form—Inspection of freight cars for interchange and method of loading will be in accordance with this Code of Rules and the Specifications for Tank Cars and Loading Rules issued by this Association. Methods of recording inspection and repairs of cars and billing therefore under these Rules *should* also be governed by *Recommended Practice* Regulations *Governing Inspection and Repairs of Cars and Billing Therefore as shown in the A. R. A. Manual of Standard and Recommended Practice.*

Reason—Account revision of Supplementary Regulations as Recommended Practice and new Rule 124.

Rule 2

The committee has approved new Interpretations Nos. 8 and 9 to this rule, as follows:

(8) Q—*Should foremen, assistant foremen, gang leaders, check clerks or any other class of supervision whether or not a portion of their time is devoted to the actual labor of transferring or adjusting lading, be considered as direct labor, to which the 25 per cent may be added?*

A.—*No; the time of such employes is already included in the 25 per cent. By direct labor is meant time of employes engaged solely in performing the direct actual labor.*

(9) Q.—*How shall cost of transfer or adjustment of lading be computed where wrecking outfit, hoist, derrick, traveling crane or similar facilities are used?*

A.—*The direct actual labor performed and material used in transfer or adjustment of lading, plus 25 per cent for overhead, should be charged.*

In addition thereto, charge should be made at a fixed rate per hour for use of wrecking derrick, including the complement of equipment required for use in connection therewith, or for any other mechanical devices used in said transfer, providing use of such facilities is not charged to shop expense. The wages of operator, fuel, oil, current, etc., required for operation, should be included in the fixed hourly rate. To such fixed rate the 25 per cent shall not be added.

Reason—To clarify the intent. These interpretations have been approved by the Transportation Division for application to Car Service Rule 14.

Rule 3

The committee recommends that second paragraph of Section (b) be eliminated.

Reason—This provision is no longer necessary.

The committee recommends that the effective date of the sixth paragraph of Section (b) (brake beams hung from trucks) be extended to January 1, 1932.

Reason—The present situation justifies this extension. However, it is the intent that no further extension of this requirement will be granted.

The committee recommends that seventh paragraph of Section (b) be modified, effective August 1, 1930, as follows:

Proposed Form—(7) Brake beam hangers and brake beam hanger pins conforming to A. R. A. *Recommended Practice or equivalent in strength,* required on all cars built new or rebuilt on or after January 1, 1930. From owners.

Reason—To clarify the intent.

The committee recommends that last sentence of Section (d) (draft key retainer) be extended to January 1, 1932.

Reason—The present situation justifies this extension.

The committee recommends that the effective dates of first and second paragraphs of Section (f) (flat car stake pockets) be extended to January 1, 1932.

Reason—The present situation justifies this extension.

The committee recommends that third paragraph of Section (r) be modified and effective date extended to January 1, 1934, as follows:

Proposed Form—(3) Refrigeration cars *must have the hatch covers secured by hinges, effective January 1, 1934. From owners.*

Reason—As an improved safety measure.

The committee recommends the addition of a new third paragraph to Section (t), and present paragraphs 3 to 10 renumbered 4 to 11 inclusive, to be included in next supplement issued, as follows:

Proposed Form—(3) *Trucks, with arch bars, prohibited, effective January 1, 1936, under all cars. From owners.*

Reason—To facilitate the application of cast-steel side frames on existing cars, because of the unsatisfactory performance of the arch-bar truck under present day operating conditions.

The committee recommends that the effective dates of paragraphs five, six and seven of Section (t) (tank cars with bead-

block anchorages or wood anchorage shims) be extended to January 1, 1932.

Reason—The present situation justifies these extensions.

The committee recommends that the effective date of second paragraph of Section (u) (cars of all-wood construction) be extended to January 1, 1933.

Reason—The present situation justifies this extension.

The committee recommends that second note following this rule be modified in the next supplement, to read:

Proposed Form—Note. Industrial or other cars not intended for interchange service when moving on their own wheels, may be accepted in interchange in their initial movement from manufacturer to destination (or seaboard) without meeting the requirements of Section (a), paragraph one, insofar as the retaining valve and A. R. A. Standard triple valve is concerned, first paragraph of Section (b) for No. 2 A. R. A. brake beams, first and fifth paragraphs of Section (c), third paragraph of Section (s), *first and second paragraphs of Section* (t) and Specifications for Tank Cars, etc.

Reason—There is no reasonable objection to such exemption of this special equipment in initial movement from manufacturer.

Rule 4

The committee recommends that fourth and fifth paragraphs of this rule be modified, as follows:

Proposed Form—Other house cars. When sheathing is split or broken, or when raked into tongue. *It is understood that adjacent raked sheathing if not split or broken will not be cardable unless raked into the tongue.*

All cars. *Ends of* roof boards broken to any extent.

Reason—To clarify the intent.

The committee recommends that sixth paragraph be modified, as follows:

Proposed Form—Box, stock and refrigerator cars, single-sheathed, *composite gondola or composite hopper cars.* When metal posts or braces are bent to the extent of being out of alignment with sheathing, *side planks* or bolt *or rivet* holes.

Reason—To provide for such damage on gondola and hopper cars.

The committee recommends a new additional paragraph in the answer to Interpretation No. 2 to this rule, as follows:

Proposed Form—In any other cases where cars damaged by unfair usage are interchanged with visible defects covered by defect cards, if it develops that there are associated concealed defects due to unfair usage which evidently occurred at same time, upon arrival of such cars at owners' shops joint inspection, within 90 days after first receipt of car home, may be made by representative of car owner and a representative of a disinterested railroad, or by a chief interchange inspector, showing list of the defects covered by the defect card as well as list of additional concealed unfair usage defects. Such joint inspection certificate shall be forwarded to the road responsible for the damage, with request for defect card to cover such additional defects.

Reason—Such protection should properly be afforded to the owner, as well as the intermediate road, against such additional handling-line defects. This practice is recommended by the chief joint inspectors. Arbitration Decision No. 926 is no longer applicable.

Rule 6

The committee recommends that this rule be modified, as follows:

Proposed Form—In addition to the provisions of these Rules, the methods of recording and reporting inspection and repairs of cars and bills therefor, as well as the filing of such records, *should* be in accordance with the *Recommended Practice* Regulations *Governing Inspection and Repairs of Cars and Billing Therefor as shown in the A. R. A. Manual of Standard and Recommended Practice.*

Reason—Account revision of Supplementary Regulations as Recommended Practice and new Rule 124.

Rule 8

The committee recommends that first paragraph of this rule be modified as follows:

Proposed Form—When repairs of any kind are made to foreign cars a billing repair card must be furnished car owner, except as otherwise provided for in Rule 108. This card must specify fully the repairs made, the reasons for same, the date and place where made and name of road making repairs; also show location of parts repaired or renewed, as per Rule 14. *When a road bills repairs made while car is in possession of another road, notation carrying this information must appear on face of billing repair card. The name of the road rendering the bill shall be shown at top of such billing repair card, irrespective of whether the repairs were made for the account of another road; where name of latter road is printed on card it shall be crossed out and name of billing road substituted.*

Reason—To enable proper check of car as to location. Also, to indicate the proper road against which exceptions may be handled.

Rule 9

The committee recommends that Interpretation No. 3 to this rule be modified, as follows:

Proposed Form—(3) Q. Does the rule contemplate showing journal length in fractions of less than sixteenths of an inch?

A. No; however, axles must not be scrapped until journal has reached the condemning limit. If, for example, journal length measures in excess of 9½ in., but less than 9$^{9}/_{16}$ in., it shall be shown as 9½ in. *This will govern axles applied as well as removed.*

Reason—Account changes in Rules 85 and 86 and to clarify the intent.

Rule 14

The committee recommends that first paragraph of this rule be modified, as follows:

Proposed Form—The end of car *upon* which *the brake shaft is located* shall be known as B end and the opposite end shall be known as A end. *If the car has two brake shafts the owner shall have the respective ends, A and B, stenciled on car, on both sides, near each end.*

Reason—Prior to September 1, 1909, the brake shaft was used for locating ends, which was the cause of serious objections due to numerous cars having two brake shafts. This situation, however, has practically disappeared, but few cars being so equipped at the present time. The present practice of ascertaining end on basis of piston traveled is very inconvenient, especially on cars having deep sills. It has also been found that many inspectors are using the brake shaft to designate the end, which is the cause of confusion due to some cars having cylinder piston travel in reverse position.

With reference to the limited number of cars with two brake shafts (usually well-hole cars), the majority of these cars now bear stenciling indicating A and B ends; it is optional with the car owner as to which end shall be marked A or B.

Rule 16

The committee recommends that last paragraph of this rule be modified, as follows:

Proposed Form—A road having in its possession an empty tank car due for the test of safety valves must make such tests in accordance with the Container Specifications as authorized by the Interstate Commerce Commission and published in Dunn's Freight Tariff No. 1, billing the owner for the cost of same. The safety valves may be tested within thirty days in advance of expiration of the time limit for such test *or on account of illegible stenciling.*

Reason—To definitely provide for such condition.

Rule 17

The committee recommends that Section (a) be modified and Interpretation No. 14 eliminated, as follows:

Proposed Form—(a) Defective non-A. R. A. Standards may be replaced with A. R. A. Standards which must comply with A. R. A. specifications. Any increased cost resulting from and any expense of alteration necessary for the application of such A. R. A. Standards shall be charged to car owner, *regardless of responsibility for the repairs.* Scrap credits will be allowed for undamaged parts thus removed.

Reason—The question of strength should not restrict the use of A. R. A. Standards, if proper fitting, except in cases noted in Section (b). Also, to eliminate Interpretation No. 14.

The Committee recommends that last paragraph of Section (c) be modified, as follows:

Proposed Form—Couplers having A. R. A. type "D" head, designed with swivel (or radial) butt, when removed account defective, *if not replaced in kind,* shall be held and promptly reported to car owner for disposition, *stating the defective part or parts.* If car owner elects to have such *secondhand* parts *of the attachment which form the swivel or radial butt,* returned, shipping directions must be furnished within thirty days, freight charges collect; otherwise, such parts may be treated as scrap. (*See Rule 104 for charges and credits.*)

The Committee recommends that Section (h) of this rule be eliminated.

Reason—Account covered in revised Rule 23, Section II, for better reference.

Rule 23

The Committee recommends this rule be revised, as follows:

Proposed Form—Autogenous welding, by either gas or electric

process, when performed, must be strictly in accordance with the following limits and regulations.

Autogenous Welding Limits and Regulations

I. General. In welding, either by the use of gas or electricity, care and good judgment on the part of the operator are of prime importance. The operator's ability as to the desired proficiency should be certified by the mechanical officers in charge or by an instructor qualified by experience in general railroad welding with the method involved.

The following general rules must be carefully observed:

II. Welding cracks or fractures (*by autogenous or other method*) will not be permitted on the following:

Axles, arch bars and tie bars; car wheels or tires; grab irons; truck equalizers; sill steps *and their supports;* spring or bolster hangers; brake staffs; brake wheels; coupler bodies, knuckles, knuckle pins, locks, lifters and throwers; tanks of tank cars; *coupler yokes; brake levers; brake beam hangers; uncoupling levers; ladder sides and their supports.*

Parts made of alloy steel or heat treated carbon steel. Top chord angles of open top all-steel cars if the fracture is located at a point betwen bolsters more than 5 ft. from the center line of either line of either body bolster.

III. Building up worn surfaces will be permissible on the following:

Parts subject to compression only.
*Spring or bolster hangers.
*Holes in levers.
†Center plates.
†Truck sides, bolsters and column castings.
Journal boxes.

End collars on axles; electric welding method preferred; must be machined to Standard dimensions. This is not to be construed as welding on entire new collar.

*Provided that the material remaining in part is equal to at least 80 per cent of the original section.

†Provided that the material remaining in part is equal to at least 60 per cent of the original section.

Coupler bodies, knuckles, locks, lifters and throwers. After building up to the original section, the same must be dressed and then checked with proper gages to insure interchangeability and proper operation.

The building up of worn surfaces on car wheels, *coupler yokes and brake beam heads,* is prohibited.

IV. Welding cracks or fractures will be permitted on the following:

(Cast-steel coupler yokes have been transferred to Section II.)

V. Regulations for Welding:

(e) The parts marked (*) in Sections III and IV, with the exception of truck transoms welded in place, must be carefully annealed by uniformly heating to approximately 1,400 or 1,500 deg. Fahrenheit and allowed to cool slowly in the atmosphere. *It will not be necessary to anneal truck side frames with journal boxes cast integral, for welds made in journal boxes in a line below the top of the journal bearing and below the corner where the journal box joins the truck side body, as per Figure 5.* [Not included here.—Editor.]

Reason—As a safety measure, and to eliminate Section (h) of Rule 17 and Interpretation No. 4 to Rule 23. These changes have been approved by the Committee on Autogenous and Electric Welding.

Rule 26

The committee recommends that this Rule be modified, effective August 1, 1930, as follows:

Proposed Form—Where necessary to renew an arch bar, or a tie bar, and the construction of truck and car body will permit, it *may* conform to the following *A. R. A. Standard dimensions. The bottom arch bar may, at option of repairing road, have turned up ends as shown on Plates 1, 2, 3 and 4 (pages 61, 62, 63 and 64.)* The renewal *shall* be confined to the defective bar or bars.

40-ton trucks (5 x 9 in. journals)	Arch bar 1¾ x 4½ in. or 1½ x 5 in. Tie bar ⅝ x 4½ in. or ⅝ x 5 in.
50-ton trucks (5½ x 10 in. journals)	Arch bar 1¾ x 5 in. or 1½ x 6 in. Tie bar ⅝ x 5 in. or ⅝ x 6 in.

Any increased cost resulting from and the expense of alteration necessary for first application of these details, shall be charged to car owner. Scrap credits shall be allowed for undamaged parts thus removed.

Arch bars and tie bars, *as to* above standard dimensions, shall be maintained in kind.

Nut lock, which shall be of soft steel, preferably copper bearing, and not less than 3/32 inches thick, is required under the bolt head and also under the nut on box and column bolts, to prevent bolt from turning, regardless of whether unit nut, lock nut or common nuts are used. *Where reference is made (on plates) to "lock nut," the use of same is optional. However, the use of "nut lock" is required.*

Reason—The present rule is impracticable and unsatisfactory. In view of adoption of time limit of arch bar trucks, this revision is justified.

Rule 32

The committee recommends that fifth paragraph be modified, as follows:

Proposed Form—Removing or cutting out parts of car to facilitate loading or *for other purposes,* except holes *not exceeding 1½ inches diameter each,* in sides, ends or *floors* of gondola cars *or in floors of flat cars* for the purpose of securing lading in *compliance* with the Loading Rules. When brake shafts (including their attachments), are removed to facilitate loading or unloading, the company replacing same will assume the expense of such replacement, except where same are missing from the car (in twin or triple shipments), in which case the delivering line is responsible for same.

Reason—To indicate that such responsibility is not confined to conditions of loading or unloading, also to permit size of holes on flat as well as gondola cars to a practical limit for purpose of securing lading.

The committee recommends that Section (a) be modified, as follows:

Proposed Form—(a) Derailment. This responsibility also includes *broken, bent or missing* part causing derailment. Etc.

Reason—To conform to the original intent.

The committee recommends that Section (d) be modified, new Section (p) added and Interpretation No. 7 eliminated, as follows:

Proposed Form—(d) Collision or impact other than that occurring in regular switching, *where one or more of the first three cars in either standing or moving cut is damaged to extent shown in Rule 44,* such as:

1. Misplaced switches.
2. Wrong or misinterpreted signals or failure to give or to observe signals.
3. Letting cars get away on incline.
4. *Failure to properly control moving cars with or without rider protection, whether or not hand brake was defective or inoperative.*
5. *Failure to properly control moving cars with car retarding device.*
6. Coupling on with locomotive only, *or while switching cars under control of locomotive.*
7. *Colliding with bumping post.*

(p) *Application of air brakes by manipulation of conductor's valve in caboose, back-up hose, angle cock, disconnecting air hose for such purpose, or any such manner of manipulation causing application of the air brakes other than from the engine cab, if car is damaged to the extent shown in Rule 44.*

Note. Car owner is responsible for damage caused by emergency application of air brakes from the engine cab or due to the bursting of an air hose, breakage of coupler knuckle, coupler pulling out or any other such failure except as otherwise provided in Section (a), (b), (c), (g) and (o).

Note. The responsibility for combination damage (Rule 44), as referred to in Section (d), (m) and (p), also includes any damage to adjoining cars in consecutive order in same draft or train.

Reason—Rearranged for better reference and to eliminate Interpretation No. 7. Paragraphs 3, 6 and 7 of Section (d) are confined to combination damage corresponding with the other paragraphs of this section, as a more reasonable measure of responsibility for such conditions. Paragraph 6 includes switching cars under control of locomotive to provide a definite measure of responsibility while so handling. Section (d) will apply to hump yards, flat yards or other locations.

The committee recommends that Section (f) be modified, as follows:

Proposed Form—(f) *Pushing car* over bumping post or other fixed obstruction, or *striking overhead fixed obstruction.*

Reason—Account impact damage previously mentioned, now covered in new Paragraph 7 of Section (d).

Rule 35

The committee recommends that this rule be modified and interpretation eliminated, effective August 1, 1930, as follows:

Proposed Form—Empty *open-top* cars offered in interchange should have hopper doors and drop doors *safely secured* in closed positon *so that the maximum opening will not exceed three inches. Defect cards shall be required for the expense of closing such doors on empty cars (in interchange).*

Note. If one or more of the doors can be closed and secured without jacking or repairs, charge on authority of defect card per Rule 107 is proper, irrespective of jacking or repairs to any

of the other doors. It is frequently impossible to determine at time of issuing defect card, whether the doors can be securely closed without jacking or repairs.

Reason—To clarify the intent. This rule is intended as a safety measure for trainmen.

RULE 43

The committee recommends that this rule be modified, as follows:

Proposed Form—Damage or loss to any car, except as provided for in Rules 32, 58, 65, 68, 84 and 99. Inside parts or concealed parts are at owner's risk, *except concealed unfair usage damage as referred to in Rule 4.*

RULE 44

The committee recommends that Section (1) be modified, as follows:

Proposed Form—(1) *Wooden underframe cars—when five or more longitudinal sills are broken new.*

Reason—The increase in number of sills broken new for combination measure for wooden underframe cars, is warranted on account of weakness and obsolescence of this construction. The furnishing of statements to car owners in cases where the repairs do not reach the combination damage should be unnecessary in view of the fact that no such evidence is required in the various other cases of owners' responsibility.

The committee recommends that Section (2) be modified, as follows:

Proposed Form—(2) *Composite wooden and steel underframe cars—when five or more longitudinal sills are damaged, providing three or more wooden longitudinal sills are broken new.*

Reason—The number of wooden longitudinal sills broken new for combination measure for composite wooden and steel underframed cars, should be limited account of decay and such old defects in these sills.

The committee recommends that Section (3) be modified, as follows:

Proposed Form—(3) *Steel or steel underframe cars—when four or more steel longitudinal sills are damaged.*

Reason—Change in form only.

The committee recommends that Section (4) be modified, as follows:

Proposed Form—(4) All-steel underframe cars having but one steel center member—*when such member is damaged,* except *where* due to progressive fracture back of body bolster or failure of cast steel extension (draft arm).

Reason—The furnishing of statements to car owners in cases where the repairs do not reach the combination damage should be unnecessary, in view of the fact that no such evidence is required in the various other cases of owners' responsibility.

The committee recommends that Section (5) be modified, as follows:

Proposed Form—(5) Two steel center sills on all-steel underframe cars having but two longitudinal sills; except when the damage is confined to the sills between the end sill and body bolster, owner will be responsible, providing after investigation it is found that car was not subjected to unfair handling as provided by *Sections (a), (b), (c), (e), (f), (m), and (o) of* Rule 32.

Reason—To clarify the intent.

RULE 63

The committee recommends that last paragraph be modified, as follows:

Proposed Form—Brake beam hanger bracket cast integral with truck side or bolster, having pin hole worn oblong to a depth of one-half its original diameter, shall be restored to original diameter by bushing or by autogenous welding process. If the hanger bracket is not cast integral with truck side or bolster, it shall be *repaired or* renewed when pin hole is worn to the extent specified above.

Reason—To permit the building up or welding of such bracket.

RULE 70

The committee recommends that paragraphs one to four inclusive of this rule, bracketed "Delivering Company Responsible," and note following the rule, be eliminated.

Reason—To facilitate inspection in interchange. It is a definite requirement that repairing line must furnish car owner with billing repair card for all wheel exchanges; this should protect car owner against the substitution of wrong wheels.

The committee recommends new additional paragraphs to this rule, and that Interpretation No. 1 be eliminated, as follows:

Proposed Form—The substitution of A. R. A. Standard multiple-wear wrought-steel wheels for cast-iron wheels standard to car, does not constitute improper repairs. If such substitution is made, however, account owner's responsibility, the charge is to be based on A. R. A. prices but in no case to exceed A. R. A. prices for new cast-iron wheels standard to car.

The substitution of cast-steel wheels or one-wear wrought-steel wheels for cast-iron wheels standard to car, constitutes wrong repairs.

Reason—To eliminate Interpretation No. 1 and clarify the intent.

The committee recommends that fifth paragraph of this rule be modified and Interpretation No. 2 eliminated, as follows:

Proposed Form—Wrought-steel wheels (multiple wear) may be substituted for cast-steel, one-wear wrought-steel or steel-tired wheels, *and the betterment charge is proper against car owner regardless of responsibility for the repairs.*

Reason—To eliminate Interpretation No. 2.

RULE 85

The committee recommends that this rule be modified, as follows:

Proposed Form—Axles broken or having seamy journals; fillets at back end of journals less than ⅛ in. radius on axles of 40,000 lb. capacity, less than 5/16 in. radius on axles of 50,000 and 60,000 lb. capacity, and less than ⅜ in. radius on axles of greater capacity; length of journal increased ⅝ *in.* over standard length, or collar broken off or worn to ¼ in. or less in thickness, or collars *built-up to thickness exceeding dimensions new, per* column "H" in table of axle sizes under Rule 86.

Reason—Experience demonstrates journal length limit can safely be increased, as recommended by the Committee on Wheels and approved by the Committee on Car Construction. To more definitely cover the intent with regard to thickness of collar.

RULE 86

The committee recommends that Sections (c) and (d) be changed to increase the permissible length of journal from ⅜ in. to ½ in. over the standard length and table under this rule be modified, as follows:

(Table under Rule 86)
(Heading "Limits of Wear")

Nominal Capacity	Column F
200,000 lb.	12⅝ *in.*
140,000 lb.	11⅜ *in.*
100,000 lb.	10⅜ *in.*
80,000 lb.	9⅝ *in.*
60,000 lb.	8⅜ *in.*
40,000 lb.	7⅜ *in.*
70,000 lb.	8⅜ *in.*

Reason—Experience demonstrates this limit can safely be increased, as recommended by the Committee on Wheels and approved by the Committee on Car Construction.

RULE 87

The committee recommends that first paragraph of this rule be modified, as follows:

Proposed Form—Any company making improper repairs by using material which the repairing line should carry in stock, as prescribed in Rule 122, is solely responsible to the owners, with the exception of the cases provided for in Rules 57 and 70. Such improper repairs must be corrected within nine months after first receipt of car on home line, to justify bill. *In all cases of improper repairs where defect card is attached to car, a notation to that effect should be made on the billing repair card.*

Reason—To conform to instructions in the Supplementary Regulations.

RULE 98

The committee recommends that second paragraph of Section (b) be modified, as follows:

Proposed Form—2. In the case of cut journal, where one or both wheels are condemned account owner's defect, if new *or secondhand* axle *or* new *or secondhand* wheels are applied, charge against car owner shall be confined to net value of *such* wheels *per Rule 101,* except as otherwise provded in Rule 86, Section (b), second paragraph. In such case if one wheel is condemned account owner's defect and mate wheel is condemned by remount gage, per Rule 82, renewal of both wheels shall be made at expense of car owner.

Reason—To clarify the intent.

The committee recommends that Interpretation No. 12 to this rule be modified to show increase in condemning limit of journal length from more than ⅜ in. to more than ½ in. over standard length.

Reason—Account change in Rules 85 and 86.

RULE 104

The committee recommends that new fourth paragraph be added to this rule and present paragraphs 4 to 8 relocated as paragraphs 5 to 9 inclusive, as follows:

Proposed Form—In case of swivel (or radial) butt couplers removed, such coupler bodies or parts of attachments forming the swivel or radial butt when renewed in kind, if owner's responsibility, shall be charged as per Rule 105; with defective parts removed credited on weight basis, except for coupler body which shall be credited on basis of 6x8 coupler body per Rule 101. Where swivel (or radial) butt coupler is replaced with A. R. A. Standard "D" coupler, if such coupler body, or body and one or more parts of attachment forming the swivel or radial butt, are returned to car owner, no credit should be allowed for any of these parts; if coupler body is not returned to owner, scrap credit as per Item 119 of Rule 101 will be allowed, irrespectivve of disposition of parts of attachment forming the swivel or radial butt.

Reason—To provide for proper settlement in such cases.

RULE 108

The committee recommends the addition of the following items to Section (b), for which no labor or material charge may be made:

Door-seal hook, pin, or chain (any or all); Journal box dust guard plug; Cut washers.

Reason—It is desirable to include these items.

RULES 124, 125 AND 126

The committee recommends that present Rules 124 and 125 be relocated as Rules 125 and 126 respectively, (Rule 126 is now vacant) and that a new Rule 124 be added, as follows:

Refunding for Improper Charges

Rule 124. The Mechanical Inspection Department of the A. R. A. Mechanical Division shall check repairs to cars, billing therefor, records, etc., to the extent considered necessary, make report of conditions as found and refunds due in adjustment of improper charges, as follows:

Section A—Checks by A. R. A. Mechanical Division of Repairs and Billing

(1) The Inspection Department of the Mechanical Division shall continually make checks of the repairs to cars and the billing therefor at the various repair and billing points. The department shall make its inspection and checks uniformly at all points, and record its findings on standard forms adopted for the purpose. It shall have access to all reports of any department considered essential to its investigations.

(2) A copy of the standard forms showing the results developed from such checks made by the inspectors of the Mechanical Division must be forwarded through the proper channel to the Chief Executive Officer of the Company, who must immediately take the necessary action to rectify any discrepancies or improper practices disclosed therein, and take such steps as will prevent a reoccurrence, advising the Association of the action taken.

Section B—Refunds

(1) The Inspection Department of the Mechanical Division will determine the extent to which checks shall be made and have discretionary power to make recommendations for correction of errors, forms or practices. Refunds shall be made for improper charges as follows:

(2) In cases detected where owner was billed for damage done in derailment or other handling line defects (if not handled under Rule 120), where adjustment has not been made, offset for the charges must be furnished owner.

(3) Where bill is rendered on defect card and the work has not been performed, the billing company shall furnish offset in amount billed.

(4) Rule 120 cases in which owner accepted responsibility and the Inspection Department develops that damage should have been handling line's responsibility.

(4-a) Where owner authorized dismantling and bill for settlement authorized, and investigation develops it was handling line responsibility, the handling line must authorize settlement under Rule 112.

(4-b) Where owner authorized repairs, the handling line must assume the responsibility by offsetting any repairs improperly billed.

(5) Where the Inspection Department, in inspecting cars on which repairs have been completed and cars O. K.'d for service at a repair point (shop or inspection yard) finds:

(5-a) That work which has not been performed is recorded on original record of repairs, or finds repairs so recorded that it results in overcharges, in which event the repair records for these cars must be immediately corrected. Repair records shall also be corrected in cases of any undercharges detected.

(5-b) That wrong repairs have been made and defect card not issued, the repairing line must issue its defect card and attach same to car.

(6) In checking billing records against original records of repairs, other improper charges are items which have been added on the billing and not supported by the original record of repairs, or where the original record of repairs show specific kind of material used, labor performed or cause for repairs and the billing repair card shows items so changed that they result in a definite overcharge. In all cases of such overcharges the car owner shall be furnished offset in amount of overcharges.

(6-a) There are possible overcharges where the original record of repairs does not show kind of material used and the record repair card shows highest priced material chargeable under the rules. It is impossible to determine to what extent these failures to record the proper kind of material used in repairs results in overcharges and therefore no refunds are required. It is, however, a violation of the rules not to properly record the kind of material used and cases of this kind will be reported to the Chief Executive Officer of the Company for correction.

(7) Other checks not specified above shall be made at the discretion of the Mechanical Inspection Department, such as amounts of material available for use as against the amount charged and on hand, ascertainment of compliance with Standard requirements for air brake repairs and periodic repacking of journal boxes, etc. The time period covered by such checks shall be determined by the A. R. A. Mechanical Division and refunds shall be made for any overcharges thus developed.

Reason—The system of checking by the A. R. A. Mechanical Inspection Department and authority for refund of improper charges detected by such checks, should properly be incorporated in the Interchange Rules instead of the Regulations.

SUPPLEMENTARY REGULATIONS

The Committee recommends that the Supplementary Regulations Governing Inspection and Repairs of Foreign Cars and Billing Therefor under the A. R. A. Rules of Interchange, Sections I to VI inclusive, revised to cover the omission of obsolete requirements and changes necessary by revision of certain Interchange Rules since the Regulations were originally issued, be submitted to letter ballot for adoption as Recommended Practice of the Division and, if approved, to be incorporated in the A. R. A. Manual of Standard and Recommended Practice.

Section VII of the Regulations—System for Refunding for Improper Charges—has been revised and relocated as new Rule 124.

Reason—To establish a permanent basic recommended practice method of recording inspection and repairs to cars and billing therefor. It is felt present conditions do not warrant the issuance and distribution of these Regulations in pamphlet form with the Interchange Rules books as heretofore.

Passenger Car Rules

RULE 2

The committee recommends that new Section (c) be added to this rule, to appear in the next supplement issued, as follows:

Proposed Form—(c) Effective October 1, 1931, cars other than passenger carrying equipment, not equipped with two-inch metallic steam heat connectors, will not be accepted in interchange. Effective January 1, 1933, no car or passenger carrying equipment, not equipped with two-inch metallic steam heat connectors, will be accepted in interchange.

Reason—The advantages of the metallic connectors justify this provision.

RULE 7

The committee recommends that last sentence of Section (j) be modified, as follows:

Proposed Form—Triple valve or control valve may be cleaned separately, if defective within the time limit. However, no charge shall be made for such work unless dirt collector and strainer are cleaned at same time. *Separate stenciling should be provided for cleaning triple valve or control valve when cleaned separately within the time limit.*

Reason—Conditions justify this practice as an economical proposition.

RULE 8

The committee recommends that new Item 14 be added to Section (a), as follows:

Proposed Form—(14) Couplers passing.

Reason—This condition should be the responsibility of handling line.

The report was signed by T. W. Demarest (chairman), general superintendent motive power, Pennsylvania; L. Richardson, chief mechanical officer, Boston & Maine; F. W. Brazier, assistant to general superintendent motive power and rolling stock, New York Central; J. J. Hennessey, assistant superintendent car department, Chicago, Milwaukee, St. Paul & Pacific; J. Coleman, assistant general superintendent car equipment, Canadian National; C. T. Ripley, chief mechanical engineer, Atchison, Topeka & Santa Fe; G. F. Laughlin, general superintendent, Armour Car Lines, and Thos. Beaghen, Jr., superintendent car maintenance, Mexican Petroleum Corporation.

Discussion

A. C. Reed (C. B. & Q.): On this matter of barring arch-bar trucks after January 31, 1936, we must take into consideration that cars will be retired in the next five years and that there will then remain on our road, about 27,000 cars to be replaced with cast steel trucks. That means about 5,400 cars a year, or 450 cars a month, and it involves an expenditure of approximately a million dollars a year for the next five years, or a total expenditure of five million dollars.

We realize that the cast-steel truck of today is an improvement over the arch-bar truck, and we do not think that any more cars should be built with the arch-bar truck, but our position is that the cars in service with arch-bar trucks should be allowed to wear themselves out, and not require them to be replaced with cast-steel trucks, we do not think we are justified in making that large expenditure.

Were we to follow the committee's recommendation and attempt to replace all arch-bar trucks, we would have approximately 10,000 car sets of cast-steel trucks from cars retired during the next 10 years. Some of the members say: "Well, use those in building new cars". On our road we are rather unfortunate in not having the older cars so constructed that we can put on an A. R. A. truck, and meet A. R. A. height requirements. We have a lot of cars that have a height from the rail to the center plate of about 24 1/2 in., where the present height, I think, is 26 3/4 in.

Nothing is said about cast-steel trucks that are in existence today. Personally I will take my chance on a good arch-bar truck that is properly inspected, properly overhauled, rather than on some of the cast-steel trucks that are operated on our railroads today. I do not refer to the present cast-steel truck design, because I think it is a good design, but there are a lot of cast-steel trucks running around over this country on freight cars that do not meet that A. R. A. specification. In fact, there are a lot of cast steel trucks that are mighty poor designs.

J. C. Hassett (N. Y. N. H. & H.): As an engineer I believe in cast-steel trucks. At the same time there are two or three things to be considered. It will cost us at the end of the five-year period about $5,000,000. Where is the money coming from? We want to go along with the A. R. A. as we have always done, but there comes a time when we feel the A. R. A. must go along with us. We feel that the period of January 1, 1936, is entirely too short, and ask that consideration be given to extending that period to what might be considered a reasonable term.

W. E. Dunham, (C. & N. W.): I do not want to have anybody think we are not heartily in sympathy with the A. R. A. cast-steel truck construction. We started in early on the cast-steel truck sides, and we have a lot of these old type truck sides which are much more dangerous on our rails than an arch-bar truck maintained and repaired as called for by the present rules, and not the proposed change. We are a whole lot better off with the arch-bar truck than we are with these older cast-steel truck sides.

We have been figuring on this thing for some time. We have been analyzing what we ought to do for the next four years to see where we can meet the situation squarely, not only from the engineering standpoint and from the service standpoint, but also from the financial standpoint. At the present time, figuring arch bar trucks only, we have some 24,000 cars equipped. Within the next five or six years, under our present program, we will have disposed of approximately 12,000 of those cars. We will still have 12,000 in 1936. They are comparatively modern cars that, in our territory, will stay with us for a long time. We have designed cast-steel truck sides for those cars. They are not A. R. A. trucks. We can't put an A. R. A. truck under those cars because of the general dimensions, but we figure that when we have to replace a truck under one of those cars on account of its condition it is advisable to spend the money at that time and put a cast steel-truck side under it. That does not mean programming so many cars a month and so many cars a year. It means that when the truck requires renewal we replace it with as modern a design of truck side as we can. If we should be forced to enter into a program it will cost us a little better than a million and a half a year to carry out any program of this kind between now and 1936, and it would cost us much more to replace these old cast-steel truck sides which were purchased on the then existing specifications and presumed to be as good as could be designed and purchased. It would cost us as much more to do that.

With a consistent program for retirement of these older cars and maintaining arch bar trucks where they are required to be repaired in accordance with the present rule and cross section of arch bars, we will get as satisfactory results from the standpoint of safety and cost of operation as can be obtained.

Just as an illustration of what we would be up against in attempting to present to our management a reason for spending a million and a half a year on a program of this kind, let me say that we keep a very careful check of the costs of derailments, and the cost, not only of equipment, but the roadbed, and the cost of picking up. In the past six months we have had six derailments due to broken down truck sides, arch-bar and cast-steel. Three of those have been cast-steel truck sides, two of foreign ownership, one of home ownership; three have been arch-bar trucks, two of foreign ownership and one of home ownership. The total cost, there not having been any injuries involved, was less than $3,000.

Now, I believe you will agree with me that we would have a very serious situation to attempt to impress the management and the directors of our road with the fact that we ought to spend a million and a half to save $3,000.

E. A. Swilley (Fruit Growers Express): Our job is to serve the railroads safely and efficiently, and I am not here to talk against the cast steel truck sides. I just want to speak for a moment on the economic condition that our company would be subjected to if any radical change was made in the design of trucks, that is, the change from an arch bar to the cast steel truck sides. We have gone along with the cast steel truck sides, and a number of years ago our cars were all equipped with cast steel sides, but due to the fact that they were not satisfactory we went back to the arch-bar truck, and up until a few years ago in the association we had two schools of thought on the question of trucks. They were divided, and we chose to go along with the arch-bar men.

Now we are going along with the cast steel truck side men, but at the present time we have approximately 28,000 cars which we operate. About 50 per cent of them are equipped with the arch-bar truck. A number of these cars are due to be retired in the next 10 years on account of obsolescence, being 30-ton trucks, and I think it would really be an economic loss to our company and to the railroads that we serve to be compelled to change those trucks rapidly.

P. P. Barthelemy (G. N.): The position of the Great Northern is nearly parallel to that explained by the Burlington and some of the other roads. We have a large number of arch-bar truck cars, possibly about 30,000. In the first place, we are not having any serious trouble with our arch-bar trucks. What I mean by that is derailments caused by them. We have failures. We have always had arch-bar failures.

Our own truck as a design always has had use for a great many years. We changed the design and adopted the cross section that is now the A. R. A. design. Our truck is such and the car design is such that we cannot use the A. R. A. truck in the present design. We would have to have a special design. We would also either have to make that design adaptable to our present bolster, or we would be up against the situation of buying new truck bolsters and other detail parts.

Then the majority of these cars are 40-ton cars. On our road we are getting away from the 40-ton car. In fact, we have not built any for a number of years, and as we retire these cars, which we are doing continually, it would leave us with a large number of cast steel frames and bolsters for which we would have absolutely no use except for scrap. The cost figures that have been mentioned here for other roads would about apply to us, and I know our management would be right up against it to try to meet such expenditures.

All the new cars that we have built for quite a number of years have been equipped with one or the other of the A. R. A. standard trucks, frames, bolsters, and so forth, strictly up-to-date, but as I said before, those are all 50-ton cars, and we contemplate heavier cars than those. Regular practice on account of the nature of our commodities and operating conditions and so forth, make a heavier unit desirable.

Retirements would naturally come pretty hard in the next few years. We are rehabilitating a large number of cars now to carry them through a 10-year period, possibly a little more, and none of those cars will have the construction that would make them adaptable to the A. R. A. truck.

We do not feel that we are in a position, and would be very much opposed to voting that this rule go into effect in this manner. That would be the stand of our company. I thank you. (Applause.)

A. Bibb (D. & H.): I speak for a railroad that has 90 per cent of their equipment equipped with arch bar trucks. In 1928 a survey was made of derailments due to arch bar trucks, and not one of them was due to the new type of A. R. A. standard section.

We have started a program on the cast steel side frames, and expect to carry it on, and I would like to just read these few notes. If the proposed new paragraph to Interchange Rule No. 3 be written into the rule without modification it will automatically rule out the 60,000-lb. capacity car of which we have a lot. Cars of that capacity are largely equipped with arch bars, and since there are still many of them in service I question the practicability of undertaking a program of installing new trucks in order to comply with this rule.

In regard to cars other than the 60,000-lb. capacity cars that are now equipped with arch-bar trucks and would have to be equipped with trucks for cast-steel side frames meeting these A. R. A. requirements, the design of those cars on our railroad will not allow us to apply a truck with A. R. A. truck center, due to the hopper. Also we have applied new bolsters extensively to these arch-bar trucks, and it would mean that we would have to throw away these new bolsters due to the distance between the guide box, to meet the A. R. A. requirement.

What to do with these trucks is the question that I would like to have answered. We surely can't reconstruct a car to satisfy the new rule.

I would like to ask this: Can we not apply a cast-steel side frame to a car where the clearances do not allow A. R. A. dimensions, a frame that will have the A. R. A. limits of strength, but that will suit our truck centers with our bolster width at the guide box?

Chairman Smart: The American Railway Association has no design of a side frame. We have only specifications.

P. Kass (Rock Island): With the heavier loading, faster speeds and intensified use, the Rock Island have been experiencing an increasing number of truck failures due to the failure in arch bars. We have for a number of years been taking our trucks apart and been giving the bars certain repairs and putting them through an annealing furnace and burning the dirt and grease off. Through that process in the early stage of that practice we found as high as 20 per cent of the arch bars fractured.

In our train yards today we have inspectors running around with wrenches tightening up bolts, with mirrors checking for fractures; cars are being delayed and set on the rip track on account of these broken bars. During the period of a year ending May, 1930, the Rock Island spent or was out of pocket $158,000 due to arch bar failures.

In the face of this experience, we of course are quite favorably inclined to the proposed rule. After we get our retirements over with, we will have approximately 5,400 cars to put the truck frames under, so that the proposed rule won't injure us much, and we are laying our plans with that thought in mind of providing equipment which we propose to perpetuate with the new cast steel truck frame.

R. A. Pyne (C. P.): If I were to subscribe to anything here that would put a rule on our railroad as proposed, I would feel like I wouldn't want to go home. We have about 200,000 cars that would be affected in a change of this kind. We have equipped all the new equipment with the cast-steel truck and we are carrying on a plan working on a budget scheme each year. In addition to the cars being retired each year automatically on account of their age, we are on a betterment program putting in the cast-steel truck sides.

When we first had information that a rule of this kind was to be imposed on the railroads we were alarmed because in the first place it would be a physical impossibility for us to meet the demand, and we are much concerned because of the cars we interchange with the American roads. We are cooperating with the idea of discarding as rapidly as possible the arch-bar truck. (Applause)

Chairman Smart: I would just like to emphasize the remarks of my Canadian friend, Mr. Pyne. He very

kindly consented to explain the conditions on the Canadian railroads and he included in that 200,000 cars the cars of the Canadian National. We have approximately 100,000 cars with arch bar trucks, so I want to thank Mr. Pyne for speaking for us too.

C. J. Bodemer (L. & N.): I believe it is time to start the ball rolling in favor of the proposed rule. You have heard a great deal of criticism in regard to this rule. Now, the gentleman from the Rock Island made the remark that if the rule was adopted it wouldn't injure their road to any great extent. I don't believe that is the proper term to use. I am sure it isn't the purpose of this association to adopt any rule that will injure. I believe this rule if adopted will result in great benefit to the railroads in general.

Now the gentleman from the Great Northern stated they did not have much trouble with the arch bar truck, and I believe he stated he had particular reference or more specifically so to their own equipment. That has been our experience in a measure. We don't have near the trouble with our own cars equipped with arch bar trucks that we do with other cars, and I think that is really the reason that so many railroads are in favor of this proposed rule.

The investigation made by a committee of this association some few years ago I think undoubtedly led to the conclusion that the proposed rule was a good one, and a logical rule. We have had serious troubles on our road with failures of arch bar trucks on foreign equipment especially, and it is all given the same attention so far as inspection is concerned, and notwithstanding the inspection that we give the equipment we still continue to have serious failures and a tremendous amount of damage by reason of the arch bar truck.

Now, we haven't kept an itemized statement of all the damages that resulted from arch bar trucks. I mean by that we haven't made as thorough an analysis as some of the larger roads have made. I would like to suggest to Mr. Kleine of the Pennsylvania if it is consistent for him to explain to this body the result of the analysis that the Pennsylvania has made showing that the expenditure which is involved in a program of retiring the arch bar truck and equipping them with cast steel side frames is fully justified. I believe he has taken into consideration not only the cost of the wrecker car, but a great many other items of expense and interference with transportation and your wrecker expense and damage to your commodity, and all those things.

Mr. Tatum: First, the A. R. A. cast-steel side frame as designed and specified I believe to be the best that is put in service. Railroads have thousands of them, and to my knowledge up to this time, and I have tried to collect data and information, I know of only one or two that have failed. Neither of those two caused accidents. They are absolutely safe and the railroads that can afford to use them will be well paid for making use of them.

This change that is proposed for 1936 is not opposed by me personally, and I don't think by our railroad if they can afford to make the change.

Some of our railroads have lots of money and can buy most anything they want, but you have heard some of these railroad representatives say here on this platform this morning that if they buy side frames for some of these cars they own that the trucks from those cars will not be suitable for new equipment they would care to build in the future. The age of those cars is such that the cost of the truck-side frames would not be justifiable, but perhaps in a few years longer they could dispose of the cars without any severe loss to themselves.

On the B. & O. Railroad we do not manufacture one new arch bar. That is our system of repairs. When an arch bar fails we reclaim an arch bar from a car that has been rebuilt, that had been found with an arch bar defect on it. We took the new material from that and used it to repair the other car. Don't think that is being done for nothing. We have been doing that for the last two or three years. Today we have got on our railroad a number of journal boxes, and they are good journal boxes made of cast iron and cast steel. I could use those boxes on an angle type frame, but if I am going to change my trucks I do not want to put back into that truck one of the sources of expense and the source of trouble.

Any railroad that can afford to do the job they will be repaid to use the A. R. A. cast-steel truck side frame that has no box bolt or nuts, no column bolt or nuts to contend with, but just how you are going to do it under these conditions we are meeting every day and under the conditions each one of these railroads spoke of, I don't know. I am sure if it can not be done within the time mentioned without undue hardship the time will be extended, but I am making this talk to encourage the use of the side frames to the fullest extent possible without harming the railroads.

A. A. Wallace (A. C. L.): As far as the Atlantic Coast Line is concerned, this proposed change would cost $10,000,000. The 17,000 cars we have are 30 ton capacity and the 40 ton truck A. R. A. standard would not be suitable for these 17,000 cars. Therefore our company cannot consistently welcome a program obligating us to completely replace the arch-bar type truck. We have kept a record of failures for the first three months of this year of the arch-bar type truck and steel design, and we had six failures, three of arch-bar type and three of the new type. We have a retirement program and we are gradually retiring this type of car, but it will be a number of years before we can retire 17,000 cars. For this reason our management is not in favor of the proposed rule.

Mr. Kleine: I think some of the pertinent points brought out by the members who spoke of the difficulty of replacing the arch bar truck with a cast-steel side frame are very worthy of serious consideration. I think the Arbitration Committee's proposed rule is a good one, and I think it is based on logic. Our present rules require that we increase the present size of arch bars in repairs which means that whenever we take off an arch bar we must increase the section above the top and bottom arch bar. Then if you are going to legislate that increased section of arch bar out of existence in a short time you are putting a double expense on the railroads, which I think is wrong, and therein I think the Arbitration Committee has formulated a very good rule. It is based on, I take it, a budget system for replacing your arch bars with cast steel side frames.

On the road I am connected with we had a total of 199,000 cars equipped with arch bar trucks several years ago. We started in on a program not to manufacture another arch bar, and we found to do that and replace them with cast steel-side frames covered a period of about twenty years. We could use the arch bars removed from the present trucks and use them in repairs, not manufacturing any new arch bars, and using a sufficient number of cast-steel side frames to replace those arch bars, which meant changing approximately 822 cars per month. We started in on that program, and that cost us, by using that second hand material, $32 per car. We started in on that program, and as budget money was available we increased it so last year we got up to an average of 2,500 cars per month. They were changed as the cars went through

the shop for heavy or Class 1 repairs so we have reduced the number of cars by the applying of cast-steel side frames and repairment program to about 140,000 arch-bar truck cars which we still have to change. While the period January 1st, 1936 may be pretty close and comprise a pretty heavy program a year, I feel if we all make an honest effort, stop making arch bars and replace them with cast steel side frames, we will get an extension of time so it will not be a particular burden.

We figure now you can get four cast-steel side frames complying with the A. R. A. section for around $120. The exchange with the material you can use from the removed trucks at our present program costs us about $98 per car. That includes some little changes in bolsters that have to be made, column slides, and so forth, and I think when you go into it you will find you can apply the standard frame or standard frame modified so you can use your present bolsters, but the serious question and the reason we must give serious consideration to the subject is the wrecks that are occurring in connection with the arch bar trucks.

For the Pennsylvania I have figures from September, 1928 up to and including May, 1930, and I have them divided between our own cars and the foreign cars. In that period we had a total of 48 wrecks due to arch bar failures on the road, or an average of 2.3 per month. On foreign and individual cars we had a total of 52 wrecks or an average of 2.5 cars per month. So, they are pretty equally divided, but a little heavier on foreign individual cars. We have on an average of 80 per cent of our cars on the home lines. That makes a total of 4.8 wrecks per month. Some of those wrecks meant four-track wrecks tying up the whole railroad. I don't think we can go along with that condition, and I think everyone is agreeable to changing from the arch-bar to the cast-steel side frame providing it isn't made too onerous from an expense standpoint.

I believe if we pass the rule as it stands it is the proper thing to do, and then get leave to an extension of time and probably single out certain cars that would be retired in eight years or ten years, especially those of obsolete design which will not permit you to put a standard cast steel side frame under them, but go ahead with the other cars and make progress reports each year, and then from those reports and business conditions in the country decide what extension of time we would require.

Chairman Smart: Not one of the members has opposed the principle of the rule, but there has been some question in their minds as to the financial condition of the companies they represent, railroads they represent, that the time limit is a little short in their minds of accomplishing the result they would like to.

We are agreed that the principle of the cast steel side frame is right. Eliminate manufacture of the arch bars, salvage your good arch bars, keep them for your repair tracks, put a number on it that your railroad can afford each month in your repair shops. That is the way we will get around this question.

W. E. Dunham (C. & N .W.): We will not put the cast-steel trucks under cars we are going to retire within the next ten or twelve years. We will, however, put our energies on retiring the older types of cast steel truck sides and if any progress is to be reported I would like to see included in the statement the retirement of the older and obsolete types of steel truck sides.

Mr. Kleine: If it is in order, I would like to make a motion that the report of the Arbitration Committee insofar as the cast-steel side frame trucks on existing cars are concerned be adopted.

O. C. Cromwell (B. & O.): On a good many of the railroads, this proposed change is going to prove a hardship. I feel quite sure that the Arbitration Committee with the facts before them is going to give serious consideration to some relief for those cars on which we will be forced to put a design of truck side frame that cannot be further used. I think this is a serious phase of the problem.

Mr. Demarest: Your Arbitration Committee in presenting this proposed rule was not alone in formulating it. In fact, the rule was formulated at a joint conference held January 10 this year in New York with members of the American Petroleum Institute and other car line owners, at which meeting I was not present. However, I agree entirely with the action taken, and I think it was most wise and desirable. The situation as it has developed here, seems to be largely a question of setting a date at which the cars will not be acceptable unless furnished with the association standard truck and frame.

In so far as the element of expense is concerned, it would appear that for the great majority of the cars still required to be equipped with cast-steel trucks, some program by the owner must be set up for taking care of them.

The speakers to whom I have listened seem to be afraid that 1936 is day after tomorrow, whereas it is five years away, with the possibility, of course, always that that date is susceptible of extension.

Mr. Tatum: If I can get some assurance, or some encouragement that we will not be compelled by the Arbitration Committee, or by this rule to put side frames under those cars that are going out in the next six or eight years, I am going to vote for the recommendation.

Mr. Demarest: I am going to answer Mr. Tatum in this way: That is not the province of the Arbitration Committee. The Arbitration Committee is his committee and is this association's committee, and it is what the association is going to do in connection with a situation of that kind when it develops that will guide your Arbitration Committee.

Mr. Tatum: I brought that question up because I feel there are some men in this room who would like to vote for this rule, but who would like to have something to back them up and to be able to say: "Mr. President, or Mr. Voss," or whoever he might be, "You are not going to be forced to put side frames under those cars which you are going to have out of service in the next eight years, even though this rule does go into effect in 1936. We are going to get rid of them." But if we have not some assurance, he might ask why the representative voted for it.

Mr. Demarest: If there are any gentlemen in that position in this room, let me remind them that they are members of the American Railway Association; that the Arbitration Committee is their committee, and on the basis of what this Association votes today, the Arbitration Committee must be guided accordingly.

Mr. Tatum: In order that we may get the sense of the gathering here as to whether a car that might live only 10 years should be forced to have applied to it a cast-steel truck side frame, I make a motion, if in order, or an amendment to the recommendation, that any railroad or all railroads are not required to apply cast-steel truck side frames to cars that will be dismantled within 10 years.

F. H. Hardin, (N. Y. C.): We are suffering, as all the rest of you are at times, from arch bar truck failures. The only thing that seems to worry those who have made a plea on the expense has been the excessive cost and the apparent drastic date which

has been fixed as the effective date for compliance. I think that the cost involved has been much overestimated. If these cars are equipped with cast-steel side frames at the time of general repair an analysis will indicate that it will cost you little if any more to apply cast-steel side frames than to repair the arch bar truck. So that the cost is the difference between the cost of application of cast-steel less the cost of repairs to the arch bar truck. That will be all you will have to pay.

I do not believe anyone will expect you to apply cast-steel side frames to a car now that you expect to retire in six or seven years. When the number of cars so equipped with arch bar trucks is reduced to a small number, I see no reason why the owning road cannot do as we have done in a number of cases of particular types of equipment, and so stencil those cars as to easily identify them with instructions that those cars shall not be loaded off your own line, and then I think everybody will be satisfied.

Chairman Smart: We have a motion before us, subject to amendment, that the report of the Arbitration Committee, insofar as the rule referring to arch bar trucks is concerned, be approved. That motion was seconded, and there has been an amendment made to the motion to the effect that any railroad or all railroads may not be required to apply cast-steel side frames to cars that will be dismantled within 10 years, unless they elect to do so.

Mr. Beaghan. (Mexican Petroleum Corporation): I wonder in connection with that, if private lines would be discriminated against. Only railroads are mentioned.

Mr. Tatum: Private lines will be included.

Mr. Bodemer: I do not believe you can well say today or at any time that a certain car is going to be retired at a certain time, and I was just wondering whether that amendment would not really defeat the purpose of the rule. A road might say that within five years from now they intend to retire a certain car, five years later, or 10 years hence, but conditions may have changed by that time and they may not retire them.

Mr. Tatum: If there is any doubt as to whether or not a car will be retired and the railroad changes its mind afterward, in order to find how sincere the railroad is on that question, I would suggest that the Arbitration Committee ask the railroads immediately after this meeting, providing this motion becomes effective, to state the cars they have in service that they expect to retire and which they consider because of being retired within 10 years should not have the cast-steel truck sides applied to them, and hold the railroads to those statements.

Mr. Demarest: If the only question between Mr. Tatum and myself in relation to this question, whether it shall stand or be withdrawn, is that when the time comes and these gentlemen are in the position of having cars for retirement beyond the period which they do not care to maintain, I will say this to Mr. Tatum: That I will use my personal influence to see that conditions are established so that those railroads will not be hurt.

Mr. Tatum: The amendment is withdrawn. I move the report of the arbitration committee be accepted and the necessary parts referred to letter ballot.

The motion stating that on or after January 1, 1936, no car equipped with arch-bar trucks will be accepted in interchange, was put to the association and carried. The motion accepting the report of the committee was carried.

Report on Prices for Labor and Materials

Price adjustments not extensive——Material surcharge to be reviewed——No change in Rule III

A. E. Calkins
Chairman

In order that the rules may currently provide an equitable basis for inter-road billing, your committee has continued the work of analyzing material, labor and new equipment costs in A. R. A. Interchange Rules 101, 107, 111 and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view of determining and recommending necessary changes to be made in the supplement effective August 1, 1930.

Rule 101

All miscellaneous material prices in Rule 101 were rechecked as of March 1, quotations from purchasing agents of eleven railroads, representing 39 per cent of total freight-car ownership in the United States and Canada, indicating that no changes were necessary in new or scrap prices except in the case of malleable iron box lids, brake shoes, malleable castings, couplers, coupler locks, coupler knuckle pins, journal bearings, dust guards, nut locks and lock nuts, unit nuts, pipe, boiler plate steel flange quality, steel tank heads, wheels, axles, No. 3 brake beams, various friction draft gears and pipe fittings.

The wording of Items 30, 137, 161, 162, 163 and note under 139, have been modified to clarify the intent.

Sufficient data was not available to permit setting up price at this time for the new A. R. A. Standard box lid, specification for which was adopted effective March 1, 1930. Your committee recommends that until such time as it is possible to secure quotations and establish price for the new lid, present allowance shown in Item 104-A for A. R. A. Standard Specification box lids apply to either the former Standard or new Standard Specification lids.

New Items 48 and 49 are recommended covering charges and credits for the variable type release valve.

New basis for determination of scrap credit value for wheels, based on price differential between price new and allowance for scrap wheels, is recommended.

Based on data received from eleven large representative roads in March, 1930, no change is warranted at this time in the hourly labor allowances.

Five new items have been added to and five items revised in table of friction draft gear prices, to cover additional types of such gears.

As outlined in the 1929 report, your committee conducted time studies of the various operations involved in connection with allowances under Items 169-E to 169-I, inclusive, of Rule 101, covering charges for periodic repacking of journal boxes, at various points on six railroads and private car lines, on a representative number of cars of each capacity, which resulted in slight revision of some of the allowances shown in the above items. The revised prices were incorporated in the Rules effective January 1, 1930. In view of the fact that few cars of 70 ton capacity were available for study at the time this investigation was conducted, your committee has made a further study on cars of this capacity and is recommending revised allowance for periodical repacking of journal boxes with journals eleven inches long and over.

For convenience in billing, your committee is recommending a new table following Rule 101 showing weight of chain per foot for various diameters.

A question having been raised as to the application under present day conditions of the allowance of ten per cent store expense and two per cent interest on investment, used in making up material prices for the Interchange Rules, your committee in conjunction with the Purchases and Stores Division will conduct investigation during the year to determine the correctness of these percentages.

Rule 107

New notes have been added to Items 20 and 22, wording of Item 40 modified and hourly allowance increased, and wording of Items 225-A and 294 modified, to clarify the intent. Note under Item 16 is eliminated because of a change in Rule 26. Item 222-B is eliminated because this operation has been added to Section (b) of Rule 108. New Item 432-A is recommended, specifying the proper charge to be made when bolts, nuts, lag screws or other items are renewed separately.

As a result of time studies conducted on seven railroads and private car lines in connection with the application of journal bearings and wedges as specified in Item 225, your committee recommends that the allowance under this item be reduced from 0.7 hours to 0.5 hours.

Rule 112

Recommendations are made in Rule 112 respecting reproduction pound prices of new freight-train cars of all classes in order that the Supplement of August 1, 1930, may reflect 1929 costs in lieu of 1928 figures shown in the present code. The prices submitted for your approval will be found to follow the trend which occurred in the 1929 market covering total new equipment purchases as compared with 1928. Pound prices for refrigerator and tank cars are based on figures furnished by representative roads and private lines in the United States and Canada. Prices for all other equipment represent the average selling prices set up by the Presidents' Conference Committee, which secured quotations on the total output of several large U. S. car manufacturers. Figures from Canadian roads were not used as their total ownership is less than one-tenth that of U. S. carriers and effect of including them in the weighted average would be negligible. No poultry cars were built during 1929 and consequently no change in price is recommended for this class of car.

Passenger Rule 21

In order that repairing line and car owner may be properly compensated in exchange of U-12 and U-12-B control valves, your committee is recommending a new second note under Item 20-C to provide proper charge and credit ($85.00) in such cases. As a result of time studies conducted in connection with the application of journal bearings and wedges, your committee is recommending a revision of the allowance (reduced from 0.7 to 0.5 hours) under Item 21-B.

Passenger Rule 22

Changes in material prices in twenty-four items under this rule are recommended, based on quotations as of March 1 from the purchasing agents of eleven representative roads.

It is the intent of the committee to investigate labor costs again in October, and if sufficient change develops, necessary revision will be made and inserted in the Rules effective January 1, 1931.

[The changes recommended in the existing rules are shown in detail in tables which are not included here.—Editor.]

The report was signed by A. E. Calkins (chairman), superintendent rolling stock, New York Central; Ira Everett, master car builder, Lehigh Valley; F. J. Doods, general car inspector, Atchison, Topeka & Santa Fe; P. Kass, superintendent car department, Chicago, Rock Island & Pacific; O. A. Wallace, supervisor car repairs, Atlantic Coast Line; T. J. Boring, general foreman, M. C. B. Clearing House, Pennsylvania; H. H. Harvey, general car foreman, Chicago, Burlington & Quincy; H. H. Boyd, assistant chief motive power and rolling stock, Canadian Pacific; A. E. Smith, vice-president, Union Tank Car Company, and A. H. Gaebler, master car builder, Swift Refrigerator Transportation Company.

Discussion

Mr. Kleine: I move you that the report of the Committee on Prices for Labor and Material be adopted for inclusion in the next issue of the Interchange Rules, and a vote of thanks given this Committee because the work as shown in this rather brief report is quite extensive and covers an entire year's work and many meetings.

(The motion was seconded, put to the Convention and carried.)

Report of Committee On Loading Rules

The work of this committee is being heartily supported by shippers generally throughout the country

S. Lynn
Chairman

During the past year your committee, as well as sub-committees, has been in conference with the automobile, lumber and steel shippers on the subject of loading rules as applied to their products. All of these meetings were attended by a large number of the manufacturers' representatives, and they displayed a very keen interest in the work of the loading rules committee, and co-operated 100 per cent in assisting your committee to have the rules up to date in order to handle the various commodities in which they are interested.

As a result of investigations conducted throughout the year, your committee submits the following recommendations for changes in and additions to the rules, and cuts for your approval and submission to letter ballot for adoption by the association.

General Rules

Rule 5

Add the following to the second note:

A. R. A. Standard, 6½ in. by 12 in. 200,000-lb. capacity.

Explanation: The 6½-in. by 12-in. axle is an A. R. A. standard, and therefore should be included in the note.

Rule 9

Proposed Form: Par. (b)—For loads carried on one bearing-piece per car (with or without sliding-pieces), located about equal distance from center of car and center of truck, the weight of lading must not exceed *two-thirds* (⅔) of the capacity when carried on cars of all-steel or steel underframe construction, or on flat or low-side gondola cars of wooden construction having more than two truss rods.

Explanation: The above rule has been modified so as to prevent overloading of a truck where the load is carried on one bearing piece per car loaded about equal distance from center of car and center of truck.

Proposed Form: Par. (e) For twin, triple or *quadruple* loads of long, flexible material, such as plates or similar lading requiring more than two sliding-pieces in addition to the bearing-pieces (see Fig. 67), the weight of lading must not exceed two-thirds the capacity of the car and the total weight of lading must not exceed 150,000 lbs. For materials of less flexibility, such as heavy channels and "I" beams requiring two sliding-pieces in addition to the bearing-pieces, as per Figs. 63, 65 and 66, or for rigid materials as per Figs. 62 and 64, requiring two bearing-pieces and no sliding-pieces, the weight of lading shall be determined by the location of bearing-pieces, as per Rules 6, 9-A, 9-B and 9-C.

Explanation: This paragraph of Rule 9 was modified at the request of one of the large steel shippers.

Rule 13

Proposed Form: The width of overhanging loads placed on single cars, when flat cars or gondola cars, as per Rule 222, are used as idlers, must never exceed the following dimensions as a maximum, and the load must be governed by the total length of lading and weight limits prescribed in table under Rule 23 for the length of car used. When drop end gondola cars are used as idlers, see limitations prescribed in Rule 221.

For intermediate lengths of cars not shown in the table, the maximum length and width of the overhanging load as shown for the next longer car will govern.

[The table has been revised to show, for each length of overhanging load, a maximum width of overhanging load for each of

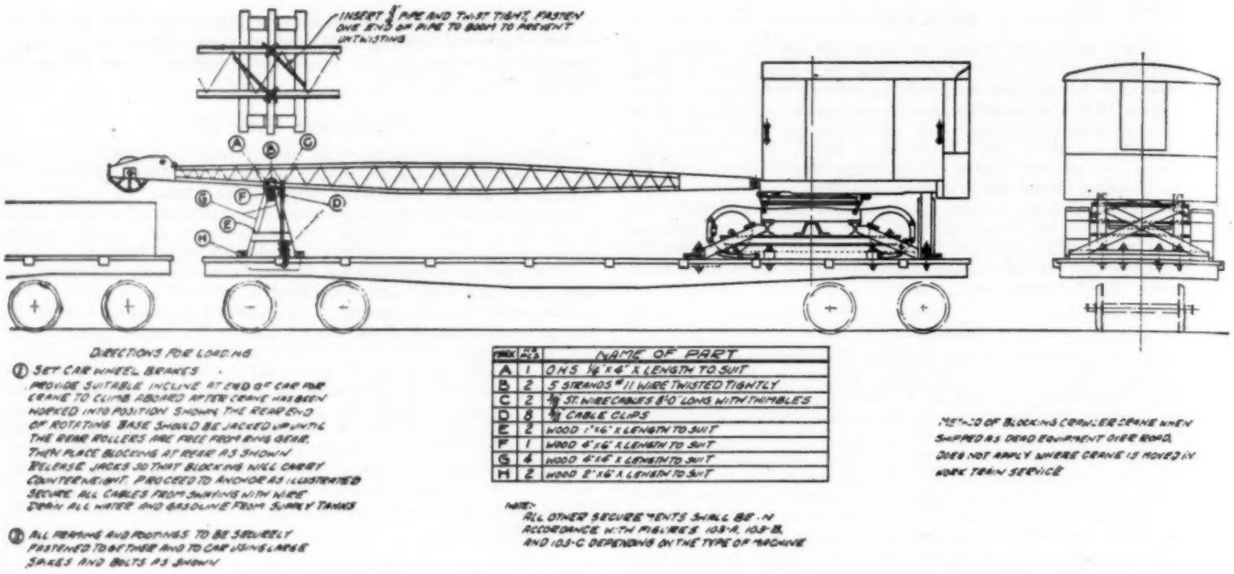

INSERT ¾" PIPE AND TWIST TIGHT, FASTEN ONE END OF PIPE TO BOOM TO PREVENT UNTWISTING
DIRECTIONS FOR LOADING
1. SET CAR WHEEL BRAKES
PROVIDE SUITABLE INCLINE AT END OF CAR FOR CRANE TO CLIMB ABOARD AFTER CRANE HAS BEEN HOISTED INTO POSITION SHOWN. THE REAR END OF ROTATING BASE SHOULD BE JACKED UP UNTIL THE GEAR ROLLERS ARE FREE FROM RING GEAR. THEN PLACE BLOCKING AT REAR AS SHOWN
RELEASE JACKS SO THAT BLOCKING WILL CARRY COUNTERWEIGHT. PROCEED TO ANCHOR AS ILLUSTRATED
SECURE ALL CABLES FROM SHARING WITH WIRE
DRAIN ALL WATER AND GASOLINE FROM SUPPLY TANKS
2. ALL FLOORING AND FOOTINGS TO BE SECURELY FASTENED TO OTHER AND TO CAR USING LARGE SPIKES AND BOLTS AS SHOWN
MARK | NO. PCS | NAME OF PART
A | 1 | OHS ⅛" X 6" X LENGTH TO SUIT
B | 2 | 5 STRANDS #11 WIRE TWISTED TIGHTLY
C | 2 | ¾" ST. WIRE CABLES 8'0" LONG WITH THIMBLES
D | 8 | ¾" CABLE CLIPS
E | 2 | WOOD 1"X6" X LENGTH TO SUIT
F | 1 | WOOD 6"X6" X LENGTH TO SUIT
G | 4 | WOOD 6"X6" X LENGTH TO SUIT
H | 2 | WOOD 8"X6" X LENGTH TO SUIT
NOTE:
ALL OTHER SECUREMENTS SHALL BE IN ACCORDANCE WITH PARAGRAPHS 103-A, 103-B, AND 103-C DEPENDING ON THE TYPE OF MACHINE
METHOD OF BLOCKING CRAWLER CRANE WHEN SHIPPED AS DEAD EQUIPMENT OVER ROAD. DOES NOT APPLY WHERE CRANE IS MOVED IN WORK TRAIN SERVICE

Fig. 103D—Method of Loading Machines with Boom Attached and Extending beyond the End of the Carrying Car

11 different car lengths over end sills, from 30 ft. to 70 ft. There is no change in the remainder of the rule.—EDITOR]

Explanation: The changes in the above rule and table were made on account of cars of greater length going into service and the necessity for the correct maximum overhanging lengths and widths of loads for the various lengths of cars; also to provide fixed dimensions for clearance and the radius of curves.

RULE 15

Proposed Form: First par.—Opposite stakes must always be fastened together, *except when the following specified fastenings are not required by the detailed rules.* [The remainder of the paragraph is unchanged.—EDITOR]

Explanation: The first sentence of this rule has been modified to clarify the intent of the rule.

RULE 23

[The maximum weights for single loads, overhanging both ends of the car and overhanging one end of the car, for cars of various capacities, have been increased and data for 10 lengths, from 52 ft. to 70 ft., have been added to the tables accompanying this rule.—EDITOR]

Explanation: Rule 23 has been revised at the request of the steel shippers on account of cars of longer lengths going into into service, and they requested that permissible weights be published to cover cars now in service which are longer than those now covered by the rule. Also, in making a study of the permissible weights now shown in the rule it was found that the weights were not calculated on a uniform basis, and your committee revised the entire rule, calculating the weights on a uniform basis for cars of various lengths and capacities.

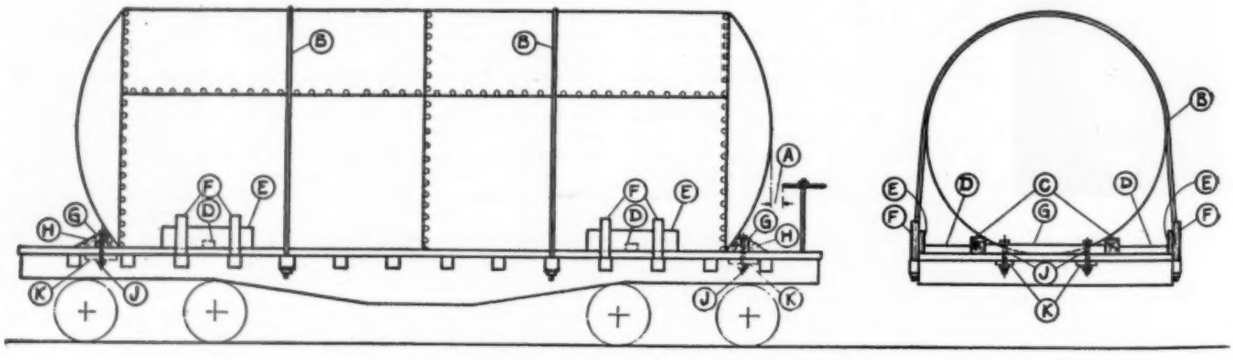
RULE 24

Proposed Form: The *lading wil lbe so placed on carrying car, or cars, that there will be not less than four (4) in. clearance between lading and floor or end gate of idler,* and must conform to Rule 12-b.

Explanation: This rule has been modified to remove a confliction between the meaning of the rule and the notes under Figs. 23 and 24.

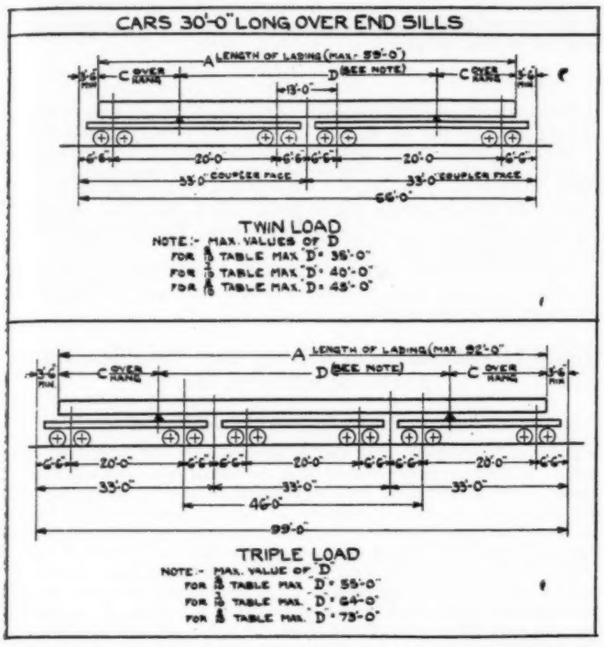
RULE 30

Proposed Form: (*a*) The width of long loads must never exceed the following dimensions for given distance between bearing-pieces or length of overhang when load does not exceed twelve



MARK | NO. PCS | NAME OF PART
A | | BRAKE WHEEL CLEARANCE NOT LESS THAN 6" FULL WIDTH OF CAR
B | 2 | TIE BANDS ¾" DIA W.I. OR FLAT BANDS OF EQUAL SECTION
C | 4 | SIDE CHOCK BLOCKS 8"X10" NOT LESS THAN 16" LONG
D | 4 | WEDGE BLOCKS 4"X6"
E | 4 | BACKING UP BLOCK 2"X8" OR 4"X8"
F | 8 | SIDE STAKES 4"X8"
G | 2 | END BLOCKS 6"X6"
H | 4 | END ANGULAR CHOCK BLOCKS 4"X8"
J | 4 | END BLOCK BOLTS ¾" DIAMETER
K | 4 | END BLOCK BOLT CLEATS 8"X4"X18"

Fig. 100—Boiler Shells and Tanks over Eight Feet in Diameter


CARS 30'-0" LONG OVER END SILLS
A LENGTH OF LADING (MAX. 59'-0")
C OVER RAMS
D (SEE NOTE)
18'-0"
20'-0"
33'-0" COUPLER FACE
66'-0"
TWIN LOAD
NOTE:- MAX. VALUES OF D
FOR A TABLE MAX. D = 35'-0"
FOR B TABLE MAX. D = 40'-0"
FOR C TABLE MAX. D = 45'-0"
A LENGTH OF LADING (MAX. 92'-0")
46'-0"
99'-0"
TRIPLE LOAD
NOTE:- MAX. VALUE OF D
FOR A TABLE MAX. D = 55'-0"
FOR B TABLE MAX. D = 64'-0"
FOR C TABLE MAX. D = 73'-0"

Arrangement of Twin and Triple Loads when Placed on Cars 33 ft. long between Pulling Faces of Couplers and Having 20-Ft. Centers of Trucks—This Sketch Shows the Maximum Lengths *A* of the Loads and the Maximum Distance between Centers of Bearing Blocks *D* upon which the Proposed Revision of Tables Shown on Pages 18 and 19 of the 1928 Edition of the A. R. A. Loading Rules Are Based

(12) ft. in height, measured from top of rail. (See Rule 228.) For loads of greater height, subtract two (2) in. from given width (w) of load for every inch of height in excess of twelve (12) ft.

(*b*) *When cars of different lengths are used for the same load, the maximum width of load as shown in the table for the longest car must be used.*

(*c*) *For cars of intermediate lengths not shown in the tables, the maximum widths of loads on carrying cars must be governed by the next greater length of car shown in the table.*

Explanation: Feelings have been expressed by steel shippers that the present tables do not clearly indicate to the shippers the manner in which twin and triple loads should be placed on cars of different lengths, for the following reasons:

1. The present tables do not give an explanation as to the length of cars.
2. Clearance width limit not shown in table.
3. Degree of curvature and the tolerance provided on maximum width loads permitted under the rule.

Your committee concurred with the views of the shippers and have worked out the following tables to more clearly indicate maximum lengths and widths on different lengths of cars.

The new tables submitted for consideration designate cars of various lengths and loads permitted, and in order to show the information requested it was necessary for the committee to work up tables for various lengths of cars, and the maximum widths of loads for different lengths of cars have been figured out, and it is proposed to include them in the new rules to indicate more clearly to the shoppers the allowable clearances on different length cars.

In our report we have included six tables [not included in this abstract] which have already been worked up, and it is the intention of your committee, if the changes herein submitted for the benefit of the shippers are approved, to include in the report five additional tables for cars of intermediate lengths, covering a range of cars from 30 to 70 ft. in lengths, both inclusive. As soon as the additional prints are completed they will be forwarded to the secretary for the approval of the General Committee, and will be included with this report for submission to letter ballot.

Rule 31

(*c*) *Bolts or rods with rolled threads may be used, but the diameter at the root of the rolled thread must not be less than the diameter at the root of standard cut threads.*

Explanation: Par. (c) has been added to the above rule to permit the use of bolts and rods having rolled threads in lieu of cut threads when desired.

Fig. 23, Page 49

Proposed Form: Note—Both bearing-pieces may be omitted when bottom layer on car floor does not exceed the length of carrying car, *or when the floor or end gate of idler is at least 4 in. below the overhanging lading.*

Explanation: This note under Fig. 23 has been modified to remove an apparent conflict between the meaning of Rules 24 and 130 and the note, in order to clarify the rules.

Fig. 24, Page 50

Proposed Form: Note—Both bearing-pieces may be omitted when bottom layer on car floor does not exceed the length of carrying car, *or when the floor or end gate of idler is at least 4 inches below the overhanging lading.*

Explanation: This note under Fig. 24 has been modified to remove an apparent conflict between the meaning of Rules 24 and 130 and the note, in order to clarify the rules.

Group I—Rules Governing the Loading of Lumber, Logs, Ties, etc.

Rule 130

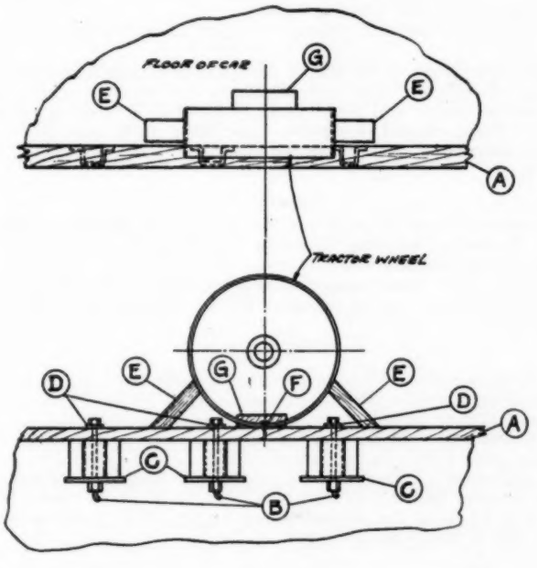
Proposed Form: When material is loaded as per Figs. 23 and 24, *it* must rest on either one or two bearing-pieces. Bearing-pieces must not be less than eight (8) in. wide and of sufficient thickness to keep the ends of lading at least four (4) in. above the floor of the idler and in length equal to the full width of the car to prevent the lading from touching the idler so that the cars can curve freely. When the bottom layer on car floor does not exceed the length of the carrying car, *or when the floor or end gate of idler is at least four (4) in. below the overhanging lading, both bearing-pieces may be omitted.*

Explanation: This rule has been modified to remove a conflict between the meaning of the rule and the notes under Figs. 23 and 24.

Group III—Loading Structural Material, Plates, Billets, Castings, etc.

Rule 216

Proposed Form: If the lading which butts against the end boards consists of only a single piece or two of a weight not exceeding a total of six thousand (6,000) lbs., no end blocking is required.



MARK	NO. REQ'D.	NAME OF PART
A	1	SUITABLE TO MAKE FLUSH WITH FLOOR AND OUT SIDE EDGE OF WHEEL
B	3	⅝" BOLT, LENGTH TO SUIT
C	3	PLATE NOT LESS THAN ½" X 6" X 8"
D	3	WASHERS
E	2	BLOCKS 3½" X 5"
F	2	½" DIA. LAG SCREWS
G	1	BLOCK 3½" X 5"

Fig. 105E—Manner of Loading Engines, Tractors and Similar Machinery, Weighing 8,000 lb. or Less on Flat Cars when Wheels Extend Beyond the Sides of the Car

Floor loads to weights shown in table under Rule 23, and superimposed loads not exceeding 15,000 lbs. on cars with steel end or steel plated ends, no end blocking is required.

Explanation: This rule has been modified at the request of a large steel shipper. It is the opinion of the committee that end blocking is not necessary for an overhang load carried on the floor of a steel end gate car.

Fig. 53, Page 103

Proposed Form: Note below figure—*Diagonal braces as per Rules, 212, 215, 227-c and 231.*

Explanation: Changes made to correspond with Rules 212, 215, 227-c and 231 in Supplement No. 1.

Rule 250-A

Proposed Form: Supplement No. 1, Page 7. Change heading to read: Alternate Method of Loading Wrought Iron Pipe *30 in. or Less* in Diameter in Gondola Cars.

Explanation: This change is necessary on account of the change made in Fig. 80-A.

Rule 251-A

Proposed Form: Flat and gondola cars: Wrought iron pipe twenty-four (24) in. or more in diameter when loaded on flat or gondola cars *must* be loaded in accordance with Figs. 81-A, 81-C, 81-D, 81-E, 81-F, or 81-G, 81-H and 81-I.

Note: Wherever iron or steel rods or bands with threaded ends having a cross sectional area equivalent to a three-quarters (¾) in. diameter rod are specified, a sufficient number of high tensile strength bands or wires totaling fifteen thousand (15,000) pounds tensile strength may be substituted for each rod or threaded band, in which case the bands or wires must be drawn equally taut and the ends twist-tied, sealed or welded in a substantial manner. Where band or wire passes through the stake pocket, the point of bend must be protected by a metal filler so that the diameter of bend will not be less than one (1) in., and so that no sharp edges will move in contact with bands or wires.

Explanation: Reference to Fig. 80-A is eliminated because of it being an alternate method of loading pipe less than twenty-four (24) inches in diameter.

Reference to Fig. 80-B eliminated because of it being an alternate method of pyramidal loading pipe fourteen (14) inches to twenty-six (26) inches.

Reference to Fig. 81-B eliminated because of this figure being eliminated from the Loading Rules.

The word *should* was changed to *must* to clarify the intent of the rule.

The note covering the use of high tensile strength steel bands in lieu of ¾" rods has been added on account of a number of shippers of small and large tanks requesting permission to use them. Experimental shipments have been made and the proposed alternative has proven satisfactory.

Fig. 80-A

Proposed Form: Supplement No. 1, Page 9—Heading—Alternate Method of Loading Wrought Iron Pipe *30 In. or Less* in Diameter in Gondola Cars.

Explanation: This change is recommended to permit loading of pipe 30 in. or less in diameter by the alternate method.

Fig. 81-A

Proposed Form: Change heading to read:

Loading Wrought Pipe on Gondola Cars. Pipe 24 in.. *to 30 in. inclusive* in Diameter.

Eliminate the *"24 in. Pipe"* reference shown in the end of one of the pipes shown in the figure.

Explanation: This change is recommended on account of pipe shippers desiring to load pipe 24 in to 30 in. in diameter as per Fig. 81-A, as the method shown in Fig. 81-B is not satisfactory and is not being followed.

Fig. 81-B

Eliminate this figure from the book.

Explanation: It is considered that this figure has become obsolete, due to the present construction of equipment making it impracticable to use the center vertical tie rod.

Fig. 81-C

Proposed Form: Loading Wrought Pipe on Flat Cars. *Pipe 24 in. to 40 in. inclusive* in Diameter.

Eliminate the *"37 in. Pipe"* reference shown in the end of one of the pipes as shown in the figure.

Explanation: This change is recommended to eliminate Fig. 81-B, and to take care of intermediate sizes of pipe as previously covered in Fig. 81-B.

Rule 259

Proposed Form: Galvanized corrugated sheet iron culvert pipe of all sizes for wiring and staking, see General Rules 14-A, 14-B, 14-C, 14-D, 14-E and 14-F, also Detail Rule 249, *except that two (2) wrappings or four (4) strands of wire may be used.* When mixed sizes are loaded on the same car, the small pipe, when possible, should be placed inside the larger size. In loading galvanized corrugated sheet iron pipe, General Rule 14-A must be complied with.

Explanation: The above rule has been modified because it is felt that the wire requirements of Detail Rule 249 are excessive for material of this kind.

Group III—Loading of Mining Cars, Engines, Boiler Shells, Machinery, etc.

Rules 302, 302-A and 302-C

It is recommended that the following note be added to this rule: *Wherever iron or steel rods or bands with threaded ends having a cross sectional area equivalent to a ¾-in. diameter rod are specified, a sufficient number of high tensile strength bands or wires totaling 15,000 lb. tensile strength may be substituted for each rod of threaded band, in which case the bands or wires must be drawn equally taut and the ends twist-tied, sealed or welded in a substantial manner. Where band or wire passes through the stake pocket the point of bend must be protected by a metal filler so that the diameter of bend will not be less than 1 in., and so that no sharp edges will come in contact with bands or wires.*

Explanation: The note covering the use of high tensile strength steel bands in lieu of ¾ in. rods has been added on account of a number of shippers of small and large tanks requesting permission to use them. Experimental shipments have been made and the proposed alternative has proven satisfactory.

Fig. 100, Supplement No. 1

Proposed Form: Mark C, Chock Blocks, revised to show the 8 in. side resting on the floor, as intended by Rule 302.

Explanation: This figure was revised to conform to Item C of the table under Fig. 100 and Rule 302.

Rule 305

Proposed Form: Shipments of engines, tractors and similar machinery, the length of which is greater than the width of the car, weighing over 8,000 pounds, with the spacing of the front wheels on the outside less than the spacing of the rear wheels, should be loaded as per Figs. 104 and 105. If the weight is 8,000 pounds or less, they may be loaded as per Figs. 105-A, 105-B or 105C. *If the wheels extend beyond the sides of cars, they must be supported on the stake pockets as shown in Figure 105-E, in which case at least one-half the width of wheel must rest on the car floor.* If the length is less than the width of the cars, they should be loaded crosswise of the car, and should be loaded with front and rear alternating so as to equalize the weight on the car. Front and rear of tractors should be securely wired to stake pockets with four (4) strands of good one-eighth (⅛) inch diameter wire, and each wheel should be securely chocked fore and aft and on each side as per figures 106 and 106-A.

Explanation: The above rule has been revised at the request of a large manufacturer. The method recommended has been tried out and proven satisfactory.

Rule 306

Proposed Form: (e) First Par.—These machines, cranes, shovels, excavators, etc., shipped on cars must be centered laterally. *If the boom extends beyond the end of carrying car, it must either be detached or loaded and protected with idler as shown in Fig. 103-D.* When attachments are left in place the dipper or bucket must rest on the car floor, or on suitable blocking, and be securely tied down.

Explanation: The above change is recommended on request from some of the Railroads handling a number of shipments of cranes, shovels, etc., on cars, as they feel that Section (e) of Rule 306, first paragraph, as now written is not practicable in all instances.

[In addition to the four illustrations included with this abstract of the committee's report, there were five additional drawings showing the arrangement of twin and triple loads with cars 38 ft., 46 ft., 50 ft., 64 ft. and 68 ft. long over the end sills. The commit-

tee also included 18 tables showing the relation between bearing piece spacing and length of lading for cars of different lengths. These tables are omitted from the present abstract of the committee's report, owing to space limitations.—EDITOR]

The report was signed by Samuel Lynn (chairman), superintendent rolling stock, Pittsburgh & Lake Erie; R. H. Dyer, general car inspector, Norfolk & Western; E. J. Robertson, superintendent car department, Minneapolis, St. Paul & Sault Ste. Marie; G. R. Lovejoy, master mechanic, Detroit Terminal; T. O. Sechrist, assistant superintendent machinery, Louisville & Nashville; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau; R. B. Rashbridge, superintendent car department, Reading; G. A. Marlow, chief car inspector, Pennsylvania; J. A. Deppe, assistant superintendent car department Chicago, Milwaukee, St. Paul & Pacific.

Discussion

Mr. Nystrom: I move that the report be accepted with certain exceptions outlined and submitted to letter ballot.

Mr. Lynn: I understand that no provision has been made for getting the modified rules before the Association or for letter ballot, and as the shipments that those rules cover are very important. There are a large number of light tanks being shipped all over the country,—I would ask that that provision be made. The shippers yesterday were very anxious about it. We have had a number of experimental loads, and they have gone through, with some few exceptions. We felt because of the few exceptions which we had which went back that we wanted to be perfectly safe. We have probably overstepped our factor of safety a little, but we feel we can modify those rules and still have a safe load. That is why we are asking permission to withdraw them and would like to have the opportunity to get the rules revamped. We will submit the rules to the Secretary for the approval of the General Committee, and if they meet with its approval they will, of course, go into the rule for letter ballot with the regular report.

(*The motion was seconded and carried.*)

Report of Committee on Tank Cars

Complete new I. C. C. and A. R. A. specifications for all classes of tank cars are submitted

G. S. Goodwin
Chairman

During the year your committee considered approximately 85 dockets and applications for approval of design, covering the following classes and number of cars as shown in the table below.

During the year the committee, as a result of the work of the subcommittee on Tank Car Specifications, completed revision of the I. C. C. specifications, recommended them to the Interstate Commerce Commission, and then completed the A. R. A. details of the I. C. C. specification shown herewith.

Specifications

The I. C. C. regulations have included tank specifications since July 1, 1927, thus superseding A. R. A. specifications for tanks to transport dangerous or poisonous commodities. The latest A. R. A. issue was in 1926. The 1926 issue of A. R. A. specifications are recommended to be maintained in the Manual for existing cars built in accordance therewith.

Revision of I. C. C. specifications were submitted to the Committee on Tank Cars in December, 1928, as stated in the last report. They were analyzed by the subcommittee on Tank Car Specifications and as a result, revisions were recommended to the Director, Bureau of Service, Interstate Commerce Commission. They were then made the subject of special modified procedure, after which they were issued by the Commission, July 6, 1929, to be effective October 10, 1929. In issuing these specifications the Commission recommended that builders take advantage of them prior to October 10, 1929, which was generally done.

TYPES OF TANK CARS SUBMITTED FOR APPROVAL

Class	No. of Cars	
ICC-103	9032	
" 103A	235	
" 103B	141	
" 103C	0	
" 104	450	
" 105	32	(Prior to 10-10-29)
" 105A300	51	
" 105A400	42	
" 105A500	33	
" 105A600	0	
" 106A500	0	
" 106A800	0	
" 107A3350	6	(Considered)
" 108	0	
" 108A	0	
ARA-203A35	58	
Total	10,093	

As the I. C. C. specifications are general and minimum in character, the subcommittee on Tank Car Specifications was instructed to prepare details and in addition to include the salient features as to requirements of the Interchange Rules and Manual to provide complete cars acceptable in interchange. The tentative specifications and procedure herewith submitted outline these conditions.

The 1929 I. C. C. specifications were not accompanied by the revised regulations. The regulations and specifications complete are expected to be issued in September, 1930. However, the specifications submitted herewith are based on those effective October 10, 1929. It is proposed to have the A. R. A. features issued with the requirements of September, and letter ballot will be submitted shortly thereafter so far as A. R. A. details are concerned.

Section A of the enclosed specifications outlines the general conditions.

Section B records the fact that the history of specification changes incorporated in former A. R. A. issues does not apply to present specifications, as they are for new cars.

Section C lists the former and present I. C. C. and A. R. A. classes of tank cars, together with information as to latest revision or date made obsolete. It is herein recommended that the present TA, TG, TC, TM, TMI, TMU and TW designations, appearing in the Manual, be replaced by designations shown in the first column.

Section D outlines procedure proposed by the committee in passing on designs and approvals referred to in the specifications. Proposals for new and changes in existing specifications are to be submitted by the committee to the Commission.

Section E is a form of application for approval proposed for uniformity and simplicity in obtaining data required for consideration.

Section F is a revised form of Certificate of Construction, to be filed by builder with the Bureau of Explosives, American Railway Association and car owner. It is slightly more in detail than formerly and is made to conform with the specifications.

When I. C. C. specifications provide for heater pipes and fixtures, Section G has been prepared, based on former requirements in the A. R. A. specifications, to enable builders and owners to arrange accordingly.

Section H, for Car Structure, is entirely an A. R. A. feature, based on former requirements brought up to date per the Manual and Interchange Rules. To this section have been added features as to center of gravity, and bolster slabbing areas. The anchorage details shown in former specifications have been further revised and amplified.

Arrangements

As arranged, the enclosed tentative specifications show, first, the I. C. C. requirements, followed in each paragraph by A. R. A. details. Each paragraph is preceded by "I. C. C." or "A. R. A." to establish the source. Where I. C. C. paragraphs are general and call for approval, details of approval requirements are shown.

Some Specifications Features

Former A. R. A. Classes of cars, such as I, II and III, are no longer to be built. The former specifications therefor are obsolete. Other A. R. A. classes are replaced by I. C. C. specifications. Therefore, the A. R. A. issue of 1926 is maintained in the Manual only to identify existing cars until finally withdrawn from service.

For non-dangerous and non-poisonous commodities there will necessarily have to be A. R. A. designs developed to cover. For that reason we have developed specification A. R. A. 203, to take the place of former class III. This is the same as I. C. C. 103 except for safety valve and bottom outlet requirements. They are designed for such articles as asphalt, molasses, etc., where vapor pressure characteristics are of a minor nature.

A new specification, A. R. A. 201A35, has been developed for tanks and appurtenances of aluminum. Such cars are for transporting glacial acid and other non-dangerous or non-poisonous commodities for which aluminum is suitable. One car was built a few years ago with welded tank seams for experimental service, and is performing satisfactorily. The 58 cars built subsequently had riveted seams with rivets of alloy aluminum, giving the required 70 per cent seam efficiency. Because of the commodity characteristics, we have specified a bursting pressure of 175 lb. per sq. in. and low safety valve or vent setting. We are informed that alloys are now being developed for aluminum sheets which may permit us to develop specifications based on 300 lb. per sq. in. bursting pressure, the same as for class I. C. C. 103. If so developed, this will be specification A. R. A. 201A60.

Considerable study was given during the year to designs of class I. C. C. 105A300, 105A400, 105A500 and 105A600.

(a) *Anchorage.*—Former and present specifications provide that anchor plates may be riveted to tank, if covered inside by rivet protection plates welded to shell. A new design was submitted during the year, consisting of a center course with bottom plate forge welded to same, the bottom plate having an integral keel for attaching anchor plates, thus avoiding rivet holes through tank shell. This design was approved for 25 cars, which have been in service about 10 months with a satisfactory performance.

(b) *Manway Nozzle Reinforcement.*—The various I. C. C. 105A specifications now call for a manway nozzle with approved wall thickness, particularly at the knuckle. Under former methods of manufacture the original shell plate was flued to form the opening, and it was felt this caused a reduction in wall thickness at the knuckle. Various designs of reinforcement were submitted and considered, and in some cases strain gage readings made. As a result four general methods are proposed.

(1) Forming manway plate from a sheet the full length of center course, 48 in. wide, of thickness 50 per cent greater than shell plate and forge welding in place.
(2) Forming manway plate from a sheet approximately 48 in. square and 50 per cent thicker than shell plate, and forge welding in place.
(3) Forming manway nozzle from a circular sheet 48 in. in diameter by 4 in. thick, machined and formed for forge welding to shell.
(4) Flueing the shell plate and a separate reinforcement plate simultaneously, forge welding the skirt first at top and after application to shell, bringing skirt down to shell and welding thereto.

(c) *Forge Welding Medium.*—In the matter of heating medium for forge welding of seams, application was received during the year to use natural gas or natural derivatives such as butane. It was claimed that these fuels are clean, free from sulphur and equal to or better than water gas. This is a technical matter requiring considerable study. Your Committee has conferred with various technical bodies. Results of such tests are awaited and decision will rest on co-operation of technical bodies available. Natural gas combined with superheated steam has been used as a heating medium.

Specification I. C. C. 107A3350 has presented some vital problems during the year. This is for high pressure seamless tubes for transporting helium. The working pressure prescribed is 2,000 lb. per sq. in. with test pressure of 3,350 lb. per sq. in. In 1929 application was received for approval of the construction of new type of container, consisting of two semispheres fusion welded. The plates were to be of alloy steel. A hearing on the matter was held by the Commission, all interested parties having been invited to attend. The Commission withheld approval as outlined in Docket No. 3666, dated February 20, 1930.

Tests

In 1927 the joint committee on Dome Covers, Bottom Outlet Valves and Safety Valves used apparatus belonging to the Union Tank Car Company. All apparatus is now installed at Purdue University. Some additional expense was incurred in the installation, including a second-hand tank car, and the three interested bodies, the American Petroleum Institute, American Railway Car Institute and the American Railway Association, participated equally in the expense. Facilities consists of a swinging tank to test valves, a second-hand tank car for volume, and valve testing apparatus. Your committee desires to express appreciation for the co-operation of bodies interested, and the Union Tank Car Company for donation of testing apparatus.

This apparatus is for testing new devices offered by car builders and owners. Your committee is encouraging the development of better 25 lb. safety valves for Class I. C. C. 103 cars. The specifications require a valve which does not leak below 20 lb. per sq. in., which will open at 25 lb. per sq. in., and with a discharge capacity which will prevent building up of pressure in excess of 45 lb. per sq. in. The A. R. A. designs have called for 5-in. valves, and it has been found difficult to make them seat properly in service and not leak below 20 lb. Your committee has been requested by the Commission to co-operate with the American Petroleum Institute in developing improved valves. For this reason the apparatus has been installed.

No laboratory tests have been made of this class of safety valves since 1927. At that time the indications were that improved types were available, but further data as to service has not been obtained. The problem is difficult but your committee hopes to receive more improved designs for test and to be able to check their performance after a period of service. Efforts should be made to produce a valve for application to new cars which will not leak at low pressure. For the present the A. R. A. design is shown in the specifications. In the meantime it is recommended new or modified valves, designed to insure greater tightness, be submitted.

Fusion Welded Seams

During the year the subcommittee on Welded Seams met at Purdue University to analyze former laboratory tests and develop future methods of tests to determine results of various processes offered. Until reliable basic data is developed, no specification for welded seams will be prepared, but a specification number A. R. A. 201W has been set aside for that purpose. The I. C. C. Specifications call only for riveted seams for Classes 103, 103A, 103B, 103C, 104 and 104A tanks.

Specifications for Tank Cars

Including those issued by the Interstate Commerce Commission and details, car structure, etc., of the American Railway Association

I. C. C. Specifications effective.....
A. R. A. Specifications effective.....

A—General

1. The A. R. A. specifications for tank cars have been issued from time to time since 1903. The last issue was effective March 1, 1926, including specifications for tanks and structure. Effective July 1, 1927, I. C. C. specifications for tanks and equipment therefor superseded that portion of the A. R. A. specifications for tanks for transporting explosives, dangerous, poisonous and high pressure commodities.

2. The I. C. C. regulations contain specifications for containers. In accordance with Section 233, Act of March 4, 1921, amending penal laws of March 4, 1909, the Interstate Commerce Commission formulated regulations for the safe transportation of explosives and other dangerous articles, including inflammable liquids and solids, oxidizing materials, compressed gases and poisonous substances. (For current issues of these regulation for freight transportation see B. W. Dunn's Tariff No. 1 and Supplement thereto.)

3. Section D, E and F of the regulations define the relations of the Commission with the Bureau of Explosives and Committee on Tank Cars.

4. The I. C. C. specifications are general and minimum for tanks and equipment therefor, used for the transportation of dangerous and poisonous commodities, and are adopted by the American Railway Association without letter ballot. They are published herein with additional details consistent with the I. C. C. requirements, and also as required to have completed cars comply with A. R. A. Interchange Rules.

5. All A. R. A. details, such as underframe, draft gears, brakes, trucks, marking, etc., shall comply with these specifications, A. R. A. Standards and A. R. A. "Code of Rules Governing the Condition of and Repairs to Freight and Passenger Cars for the Interchange of Traffic" and I. C. C. requirements as to safety appliances.

6. All tanks and appurtenances therefor constructed for transporting dangerous and poisonous commodities as defined in I. C. C. regulations, shall comply with the appropriate I. C. C. specifications. All other car parts shall comply with A. R. A. specifications, standards and Interchange Rules.

7. All tank cars constructed for transporting commodities which are not dangerous or poisonous, shall comply with appropriate A. R. A. specification; or may be made to comply with the appropriate I. C. C. specification.

8. Any tank which does not meet the test and retest requirements prescribed therefor shall be prohibited in interchange and withdrawn from service.

B—Historical Record of Specification Changes

Record of changes as published in past A. R. A. issues do not apply. The specifications contained herein are for new cars.

C—Tank Car Classification on Designations

The following is a complete classification of former and present tank cars, including those covered in this issue.

Index No.	Class	Orig. date effective	Latest revision	Still in effect	Date Spec. obsolete	Remarks
T 1	ARA I	Before 1903		No	1-1-03	
T 2	ARA II	1-1-03		No	5-1-17	
T 3	ARA III	5-1-17		No	7-1-27	
T 4	ARA IV	5-1-17		No	7-1-27	

Index No.	Class	Orig. date effective Before 1903	Latest revision	Still in effect	Date Spec. obsolete	Remarks
T 5	ARA IVA	10-1-25		No	7-1-27	
T 6	ARA V	1-1-18		No	7-1-27	
T 7	ARA VI	1-1-25		No	10-10-29	
T 8	ICC 103	7-1-27	10-10-29	Yes		
T 9	ICC 103A	7-1-27	10-10-29	Yes		
T 10	ICC 103B	7-1-27	10-10-29	Yes		
T 11	ICC 103C	8-15-28	10-10-29	Yes		
T 12	ICC 104	7-1-27	10-10-29	Yes		
T 13	ICC 104A	7-1-27	10-10-29	Yes		
T 14	ICC 105	7-1-27		No	10-10-29	
T 15	ICC 105A300	8-15-28	10-10-29	Yes		
T 16	ICC 105A400	12-15-28	10-10-29	Yes		
T 17	ICC 105A500	12-15-28	10-10-29	Yes		
T 18	ICC 105A600	12-15-28	10-10-29	Yes		
T 19	ICC 106A500	10-10-29	10-10-29	Yes		
T 20	ICC 106A800	10-10-29	10-10-29	Yes		
T 21	ICC 107A3350	10-10-29	10-10-29	Yes		
T 22	ICC 108	7-1-27	10-10-29	Yes		
T 23	ICC 108A	7-1-27	10-10-29	Yes		
T 24	ARA 201A35	When approved				
T 25	ARA 201A60					Pending
T 26	ARA 203					Pending

D—Procedure

1. *Applications for Approval.*—(a) Applications for approval of new or modified designs, specifications or materials for tanks and equipment therefor shall be submitted to the Secretary, Mechanical Division, American Railway Association, for appropriate committee action.

(b) Applications for approval of designs to be used in constructing cars under these specifications, shall be submitted to said secretary.

(c) Applications will be considered by the Committee on Tank Cars only when made by tank car owners or builders.

(d) All applications, except as noted below, shall be made in 14 sets, including drawings and calculations, folded to approximately 8½ in. by 11 in. in size, for prompt distribution and action.

(e) When cars which are identical in all details are to be built in groups or series, one application shall suffice for such group or series.

(f) Applications shall be made in the form prescribed herein.

(g) When applications are made for approval of designs, etc., where previously approved under appropriate specifications the prescribed form of application shall be used, but drawings, etc., need not be resubmitted. Formerly approved designs may be re-approved by said secretary for additional cars upon approval of the committee chairman, without further committee action.

(h) When applications are made of designs which the committee desires to have tested, such tests shall be made as directed by the committee, at applicant's expense. Tests made other than as directed by the committee will not be accepted.

(i) Applications for approval of designs of multiple unit tank cars shall be submitted to said secretary, in form prescribed, 14 sets of drawings and calculations of tanks and equipment therefor for the Committee on Tank Cars, and 20 sets of anchorage and car structure parts for the Committee on Car Construction.

2. *Alterations.*—In case of alterations of or additions to existing tanks and equipment therefor which change the data on existing certificate of construction, application for approval shall be submitted and approval received before such cars are placed in service. Certificate of constructions shall be furnished.

3. *Approvals or Rejections.*—Approvals or rejections of applications, based on appropriate committee action, shall be issued by said Secretary.

4. *Certificate of Construction.*—(a) Before a tank car is placed in service the party assembling the completed car shall furnish to the Bureau of Explosives, to the secretary, Mechanical Division, American Railway Association, and to the car owner, a certificate of construction in the form prescribed herein, certifying that the tank, equipment and car complete comply with all the requirements of the specifications therefor.

(b) Where cars which are identical in all details are built in groups or series, one certificate shall suffice for each group or series.

(c) In case of alterations of or additions to tanks and equipment therefor from original design and construction, a certificate of construction as prescribed herein shall be rendered to the parties prescribed herein.

E—Application for Approval

To Secretary, Mechanical Division, American Railway Association.

Application is hereby made for approval of designs, materials and construction of the following car or cars:

[Detailed data called for on application are omitted.—EDITOR.]

F—Certificate of Construction

To Bureau of Explosives; to Car Owner; to Secretary, Mechanical Division A. R. A.

It is hereby certified that drawings were submitted for these cars and approved by the A. R. A. Committee on Tank Cars under date of .....; that these cars were constructed in accordance with specification.....; that materials used conform as to factors of strength, chemical analyses and physical qualities; that workmanship and all car features of construction, equipment, marking, etc., conform to current requirements of I. C. C. regulations or A. R. A. specifications applying, U. S. Safety Appliances and A. R. A. Standards and Interchange requirements; and that the data, specification and drawings are identified as follows:

[Detailed data called for on certificate is omitted.—EDITOR.]

G—Specifications for Tank Car Heater Pipes

Approvals of Designs.—(a) Application for approval of designs of heater pipe systems for installation in new or existing tanks shall be submitted to said Secretary, and approval by appropriate action obtained before cars with heater pipes are placed in service.

(b) For resubmission of designs formally approved, see Section D, paragraph (f).

(c) Installations shall be reported on certificates of construction.

INTERIOR HEATER PIPES

1. *Heater Pipes and Fittings.*—Pipes shall be not less than 2 in. extra heavy lap welded or seamless tubing of equivalent strength. Joints shall be made by threaded wrought couplings, forged unions or welding. A minimum number of connections shall be used.

2. *Return Bends.*—Cast iron, malleable iron or cast steel return bends shall not be used. Return bends shall be forged or made by bending the pipe. Cast or forged manifolds of approved design are permissible.

3. *Application to Tank.*—All piping shall be properly secured to permit necessary expansion and contraction.

4. *Inlets and Outlets.*—(a) Inlets and outlets shall be so located in any portion of dome, shell or heads of tanks or steam jacketed outlet as to afford proper self-drainage of the entire system.

(b) Breakage groove not required on steam jacketed outlets.

(c) When ends of steam coils are not attached to manifold or steam jacketed outlet chamber they shall be attached to pads or reinforcements, which pads or reinforcements shall be riveted or welded to tank or dome. Outside pipe connections to steam coils shall not be an integral part of the interior coils and shall be screwed or welded, or both, into outside of pads or reinforcements.

(d) Both inlets and outlets of heater pipes shall be equipped with valve cock, cap or plug. Caps and plugs shall be secured by chain.

5. *Heater pipe* system for each compartment of a compartment tank or each tank of a multiple-unit tank car shall be treated as a separate tank and comply with the requirements contained herein.

6. *Tests and Retests.*—(a) When installed, the heater system of each tank shall be tested with hydrostatic pressure and shall be tight at 200 lb. per sq. in.

(b) Similar tests shall be made after renewals of any part of heater system.

(c) Each time tanks having heater systems are retested as prescribed in the specifications therefor, the heater system shall also be retested and be tight at a hydrostatic pressure of 200 pounds per square inch.

7. *Reports.*—Reports shall be made on certificate of construction when heater pipes are installed, including report of initial test. Reports of retests of tanks shall include retests of heater pipes.

8. *Marking.*—Tanks having heater systems shall be stenciled in accordance with Fig.....

EXTERIOR HEATER PIPES

When exterior heater pipes are applied to tanks they shall be secured by bands or other approved method.

H—Car Structure

1. *All car parts* shall comply with these specifications and A. R. A. standards as made mandatory by current A. R. A. "Code of Rules Governing the Condition of and Repairs to Freight and Passenger Cars for the Interchange of Traffic.

2. *Underframe.*—(a) Underframe shall be of steel which complies with A. R. A. specifications for Structural Steel, Steel Plates and Steel Sheets for Freight Equipment Cars.

(b) Rivets shall comply with A. R. A. specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars.

(c) Underframe shall be equipped with cast or forged center plates. Malleable iron may be used for other details such as striking plates, draft lugs, side bearings, push-pole pockets, etc. Steel and malleable iron castings shall comply with A. R. A. specifications.

(d) *Center Sills.*—The center sill construction shall meet the following requirements:

(1) Minimum center sill area between points of impact, 30 sq. in.

(2) Ratio stress to end load, not more than 0.05.

(3) Length of center or draft sill members between braces shall be not more than 20 times the depth of member, measured in the direction in which buckling may take place.

(4) Continuous sills having cover plates are preferable.

(5) If other construction is used the effective cross-sectional area, including connections, must be at least as strong as continuous sills.

(e) Draft Attachments.—Per A. R. A. Manual.

3. *Body Bolsters.*—Body bolsters shall be of steel castings or of the built-up type, thoroughly substantial and sufficient in strength to take at least one-half the total weight of loaded tank car or each side bearing. Provision shall be made for jacking under bolsters.

4. *Draft Gear.*—The tank car shall be equipped with a draft gear having a minimum capacity of 150,000 lb.

5. *Couplers.*—A. R. A. Standard as for all other classes of freight equipment cars.

6. *Brakes.*—A. R. A. Standard as for all other classes of freight equipment cars.

7. *Push-Pole Pockets.*—There shall be a push-pole pocket at each corner of the car. Where, due to construction of car, push-pole pockets cannot well be placed on corners of underframe, they shall be applied to body bolsters.

8. *Trucks.*—The trucks as a whole shall be equal in strength to the carrying capacity of the axles. Wheels, side frames, axles, journal boxes, bearings, center plates, etc., shall be in accordance with A. R. A. standards. Arch-bar trucks prohibited.

9. *Placard Boards or Holders.*—Each tank car shall be equipped with the required number of suitable placard boards or holders, permanently attached by suitable brackets and in location prescribed by I. C. C. regulations. These holders or boards shall be of sufficient size to permit placards to be applied with opposite points of the diamond in vertical or horizontal positions respectively.

10. *Safety Appliances.*—Safety appliances shall be in full compliance with United States Safety Appliances, standard.

11. *Marking.*—Each tank car shall be marked, stenciled and equipped with badge plates in accordance with I. C. C. and A. R. A. requirements. See Fig.—.

12. *Center of Gravity.*—(a) The center of gravity of the loaded car shall be reported on certificate of construction. For determining the center of gravity the weight of lading shall be the difference between the rail load limit and light weight of car.

(b) In computing the center of gravity the following factors shall be used:

Trucks based on an arm of.....16.50 in.
Underframe based on an arm of.....33.75 in.
Tank, including connections, insulation, etc., based on an arm equal to the distance between center of tank and top of rail when loaded (namely, light weight height less ¾ in.).

13. *Anchorage.*—(a) The minimum shearing and bearing values of rivets connecting longitudinal anchor plates to tank and underframe shall be as follows:

(b) Where the rail load limit does not exceed 169,000 lb.:

Connection of single piece anchor plates to tank:
Shearing area of rivets, not less than 30 sq. in.
Bearing area of rivets not less than 24 sq. in.
Connection of anchor plates to underframe:
Shearing area of rivets, not less than 15 sq. in.
Bearing area of rivets, not less than 12 sq. in. The shearing and bearing areas of rivets shall not exceed 70 per cent of the shearing and bearing, respectively, of those used for connection of anchor plates to tank.
For computing rivet areas, the effective diameter of a driven rivet is its nominal diameter plus 1/16 in.

(c) When the rail load limit of tank car is more than 169,000 lb. but does not exceed 210,000 lb., all shearing and bearing areas for single-piece anchorage specified in paragraph (b) hereof shall be increased by 25 per cent.

(d) When the rail load limit of tank car is 210,000 lb. or more all shearing and bearing areas for single piece anchorage specified in paragraph (b) hereof shall be increased by 50 per cent.

(e) A single-piece anchor is one having one longitudinal anchor plate on each of the two center sills.

(f) A Multiple-piece anchor is one having more than one longitudinal anchor place on each of the two center sills. When multiple-piece anchor plates are used, the minimum rivet areas prescribed for single-piece anchorage shall be increased by 20 per cent.

(g) Head block anchorage prohibited.

14. *Tank Bands.*—(a) Each tank (except multiple-unit tanks) shall have at least two bands, one at each bolster. If more than the prescribed two bands are used, their location is optional.

(b) All tank bands shall be in direct contact with outside of main shell.

(c) The sectional area of the tank band shall at no place be less than one square inch. A threaded end 1¾ in. or more in diameter, with body consisting of a flat band 2 in. by ½ in., or equivalent section, or round iron 1⅛ in. in diameter, will be accepted as meeting this requirement.

15. *Bolster Slabbing.*—(a) Contact bearing areas shall be as follows:

For cars with 40-ton trucks, not less than 12 sq. ft.
For cars with 50-ton trucks, not less than 15 sq. ft.
For cars with 70-ton trucks, not less than 20 sq. ft.
For cars with 100-ton trucks, not less than 25 sq. ft.

(b) Not less than 50 per cent of the above prescribed minimum of number of square feet of bolster slabbing bearing area shall be outside the zone of center sill construction.

Arrangement

The I. C. C. specifications effective October 10, 1929, are included herein, amplified by A. R. A. details or additions not inconsistent therewith. Each I. C. C. paragraph is begun with "ICC" and each A. R. A. paragraph or addition is begun with "ARA." This is done to make the distinction clear.

Additional Specifications

[Additional specifications covering tanks or containers of the various classes enumerated in the table at the beginning of the report are also included in the report but are omitted in this abstract. A list of these specifications is given below.—EDITOR.]

1—*Shipping Container Specification ICC-103.* Riveted steel tanks to be mounted on or to form part of a car.

2—*Shipping Container Specification ICC-103A.* Riveted steel tanks to be mounted on or to form part of a car.

3—*Shipping Container Specification ICC-103B.* Rubber-lined riveted steel tanks to be mounted on or to form part of a car.

4—*Shipping Container Specification ICC-103C.* Riveted alloy-steel tanks to be mounted on or to form part of a car.

5—*Shipping Container Specification ICC-104.* Lagged riveted steel tanks to be mounted on or to form part of a car.

6—*Shipping Container Specification ICC-104A.* Lagged riveted steel tanks to be mounted on or to form part of a car.

7—*Shipping Container Specification ICC-105A300.* Lagged welded steel tanks to be mounted on or to form part of a car.

8—*Shipping Container Specification ICC-105A400.* Lagged welded steel tanks to be mounted on or to form part of a car.

9—*Shipping Container Specification ICC-105A500.* Lagged welded steel tanks to be mounted on or to form part of a car.

10—*Shipping Container Specification ICC-105A600.* Lagged welded steel tanks to be mounted on or to form part of a car.

11—*Shipping Container Specification ICC-106A500.* Welded steel tanks to be mounted on or to form part of a car.

12—*Shipping Container Specification ICC-106A800.* Welded steel tanks to be mounted on or to form part of a car.

13—*Shipping Container Specification ICC-107A3350.* Seamless steel tanks to be mounted on or to form part of a car.

14—*Shipping Container Specification ICC-108.* Lined, coated or treated wooden-stave metal-hooped tanks. For mounting on or to form part of a car.

15—*Shipping Container Specification ICC-108A.* Metal-jacketed coated, wooden-stave metal-hooped tanks for mounting on or to form part of a car.

16—*A. R. A. Shipping Container Specification ARA-201A35.* Riveted aluminum tanks to be mounted on or to form part of a car.

17—*Shipping Container Specification ARA 203,* Riveted steel tanks to be mounted on or to form part of a car.

The report of the committee on Tank Cars is signed by G. S. Goodwin, (chairman), assistant to general superintendent motive power, Chicago, Rock Island & Pacific; A. G. Trumbull, chief mechanical engineer, advisory mechanical committee, Van Sweringen Lines; George McCormick, general superintendent motive power, Southern Pacific; F. A. Isaacson, engineer car construction, Atchison, Topeka & Santa Fe; W. C. Lindner, chief car inspector, Pennsylvania: G. A. Young, head, school of mechanical engineering, Purdue University; W. E. Cooper, supervisor tank car department, Bureau of Explosives; A. E. Smith, vice-president, Union Tank Car Company; T. H. Beaghen, Jr., Mexican Petroleum Corporation; H. L. Worman, superintendent motive power, St. Louis-San Francisco; G. E. Tiley, supervisor tank car equipment, General Chemical Company and C. C. Meadows, Tidal Refining Company.

Discussion

Mr. Demarest: I move the adoption of the report.

Chairman Smart: That carries with it, of course, that a certain portion of this will go to letter ballot. That is understood.

[*The motion was seconded and carried.*]

[*The report on Brake and Brake Equipment and that on Wheels were presented and discussed. Time limitations, however, prevent getting them into today's* DAILY. *They appear in the next issue.*—EDITOR]

REGISTRATION

Division VI—Purchases & Stores

(*Continued from Page 1454D114*)

Schuetz, Leonard, Genl. Matl. Supvr., P., Jefferson
Schultz, F. W., S. K., P. R. R., Grand Atlantic
Schultz, G. H., A. P. A., Penna., Chelsea
Scott, Geo. E., P. A., M. K. & T., Traymore
Sharpland, E. S., D. S. K., I. C., Shelburne
Sickel, S. R., Ch. Clerk C. C., Reading
Sidey, W. J., S. K., B. R. & P., Seaside
Simons, Webster L., Stk. Clk., B. & M., Chalfonte
Smith, C. Edward, Gen. Matl. Supvr., P.
Smith, H. F., C. C. to G. S. K., S. P., Princess
Smith, J. Leo, S. K., R. F. & P.
Smith, Montgomery, Retired A. P. A., P.
Sorensen, A. E., M. of S., Erie, Chalfonte
Sorenson, A. E., Mgr. of S., Erie, Chalfonte
Spering, E. L., Trav. Aud., Penn., Biscayne
Spratley, J. O., S. K., I. U., Kentucky
Stackfole, W. S., G. S. K., P. Ser. Co., Eastbourne
Stackhouse, H. Clinton, Clk. P. A. Office, Penna.
Stackhouse, R. J., Ret'd, S. K., Reading, St. James
Starritt, W. A., P. A., Clinchfield, Chalfonte
Stevens, M. W., Dist. S. K., C. N., Seaside
Stewart, A. D., S. K., N. & W., Ambassador
Stewart, Ernest, Catalog Insp., Chelsea
Stohner, Wm. A., Pur. Dept., P. R. R.
Stover, Raymond G., Stkr, Reading, Shelburne
Stow, Grnak, S. K., Central R. R.
Sturgis, John M., Req. Marker, P. R. R.
Sullivan, J L., G. Tr. S. K., U. P., Haddon Hall
Surman, Walter, Clerk, P. R. R.
Sutherland, Lloyd, G. S. K., P. & L. E., Shelbourne
Sutton, C. G., Div. Stk., B. & O.
Taylor, W. H., Report. Strkpr., Penna.
Temmerling, B. B., Asst. Ch. Matl. Supvr., P.
Thomas, G. W., Dist. S. K., L. V., Jefferson
Thompson, A. S., P. A., C. & G., Haddon Hall
Thompson, H. M., Reporting Str. Kpr., P. R. R.
Thornley, E. W., P. A., P. & D., Haddon Hall
Tigh, John H., Foreman, Reading
Tiller, C. L., D. S. K., So., Marlborough
Tindal, R. L., P. A., N. Y. C. & St. L., Ambassador

Motor Transport

Ahern, H. C., M. M. C. S., B. & M.
Carey, F. J., Mgr. Trucl. Opr., B. & M., Chaltonte
Duke, Wm. D., Gen. Mgr., R. F. & Penna., Breakers
Foster, C. B., G. P. T. M., C. P., Haddon Hall
Hatton, Arthur, Genl. Supt. of Trans., C. P., Haddon Hall
Johnson, B. O., Asst. to V. P., N. P., Ritz-Carlton
Lanigan, J. V., P. T. Mgr., I. C., Haddon Hall
Marr, L. K., Asst. Gen. Supt., Penna., Chalfonte
Tripician, J. F., Of. G. S. S. & Trans., P. R. R., Haddon Hall

Special Guests

Anderson, Master Howard
Anderson, Master Paul
Bagwell, C. C., Jr., Shelburne
Bartel, Wm. P., D. B. of S., I. C. C., Morton
Barton, J. D., Traymore
Baynes, P. T., Clerk, Penna., Penn Alto
Becker, Mrs. A. H., Ambassador
Biety, G. J., Brighton
Bjorkholm, Jack, Ambassador
Bjorkholm, Jim, Ambassador
Black, D. S., Clk. Act. Dept., P. R. R.
Bogdanoff, S. A, C. M. P., O. S. S. R., Breakers
Bollow, John
Boltwood, Harvey, A. D. B. of S., I. C. C., Shelburne
Borland, W. P., Div. B. of S., I. C. C., Traymore
Boustman, Paul R., Steno., N. Y. C., Haddon Hall
Bradshaw, C. A., Insptr. of Trans., L. & N., Marlborough
Breen, Fred, Asst. Secy., R. S. M. A.
Brenholtz, Thomas S., Draft, Reading
Brown, Norwood, Princess
Buchanan, A. E., Asst. G. P. A., Penna.
Case, Master Donald A., Pennhurst
Chamberlain, W. S., Dennis
Christian, W. J., T. A., Reading
Christy, Harold W., Shelburne
Coffman, John M., Runnymede
Copenhafer, D. T., Examiner, I. C. C., Iroquois
Cratzer, C. A., Pass. Rep., Penna.
Crawford, J. C., Asst. Engr., P.
Curtis, E. L., Spl. Rep., Penna., Penn Atlantic

P.&S. Division Hears Contest Winners

A plan for purchasing and pointers on storekeeping given by winners of fourth annual competition

THE final event in the contest which the Purchases & Stores division conducted during the year for papers on purchasing and stores work was staged before the convention yesterday when the contest winners, Paul H. Day, requisition clerk, Bangor & Aroostook, and H. W. Rolston, statistician in the purchasing department of the Pennsylvania, were called upon to present their papers. The competition was the fourth held by the division and was conducted, as in past years, to stimulate the interest of the younger men of the railway supply departments in purchasing and stores work and also in the activities of the division. It was open to all employees below the rank of assistant purchasing agent and assistant general storekeeper and listed the men to write upon any subject relating to purchasing, stores and distribution of material. The papers were rated on a basis of 50 per cent for originality of the subject, ideas, conclusions and solutions of problems involved; 25 per cent for general interest and importance of the subject; 20 per cent for conciseness, clearness and grammar; and 5 per cent for general appearance and neatness. They were judged by a committee consisting of A. L. Sorensen, manager of stores, Erie; J. U. King, general storekeeper, A. C. L.; and F. S. Austin, purchasing agent, B. & A.

The winning papers, which shared the honors equally, were selected from a group of approximately fifty entered from various railroads, Mr. Day writing on the subject "Is Turnover Always of Primary Importance?" and Mr. Rolston, on the subject "Products and By-Products of Certain Purchasing Methods". In his paper, Mr. Rolston pointed out that present-day purchasing is not confined to the narrow limits of routine procedure, but should be conducted with a view to the great opportunities afforded the purchasing agent to serve the railroads through his contact with the shippers and his co-operation with manufacturers in solving purchasing problems of mutual concern. He described the method of periodic purchasing as an example of what could be done. Mr. Day urged that a railroad can often lose money by following too closely the principles of turnover and piece meal buying and presented several analyses of typical stores activities relating to the ordering of material which illustrated the importance of taking into consideration such features in buying as freight allowances, freight discount, standard packages, etc. The papers are presented in part as follows:

Is Turnover Always of Primary Importance?

By Paul H. Day

Requisition Clerk, Bangor & Aroostook, Derby, Maine

Paul H. Day

For several years much has been written and said about turnover. Great effort has been used to increase the rate of the flow of materials in and out of store stock as compared to the total amount carried on hand. Immense reductions in the inventory have been effected by diligent applications of the principles of hand to mouth buying. However, the time has possibly come when we should consider whether or not some of these efforts will continue to bring about greater economies. Experience shows that quite frequently it is very advantageous to order certain materials in larger quantities than would be warranted by the record of consumption as shown by the stock book.

Price Versus Carrying Charges

It is generally agreed that carrying charges should be figured at 15 per cent. If the savings involved will not cover the 15 per cent charge, then an item must not be ordered in quantities over the amount needed to protect the service. However, if increasing an order to twice or three times the amount actually required at the time saves 20 per cent to 30 per cent or even 50 per cent in the purchase price, then very logically that is the thing to do, provided that ample storage facilities are available and that it is certain that the item will not become obsolete before it will be used.

No one would recommend ordering six months' stock of an item in order to save freight charges amounting to 1 per cent of the invoice value of the order. On the other hand, this would be advisable, if by doing so the freight allowance would be obtained, in a case where the freight would be perhaps 5 per cent of the regular value of the regular order. In this instance, it would seem logical to figure 6 per cent interest charges on the investment since there would be no real depreciation, obsolescence or other such charge on an active item.

Economy in Standard Lots

Again, a certain commodity is available in standard cases. When ordered in such quantities the shipper ordinarily allows an additional discount. On any smaller amount ordered, the price is net, no discount. Therefore, if the stock book record of an item indicates that the consumption, covering 60 days' requirements, would be less than a standard case lot; following the stock book would result in the loss of an available discount.

It would seem logical, therefore, when ordering an item of definite average consumption to give careful consideration to the benefits that may be obtained through specifying standard cases. In many instances investigation will disclose that the discounts obtainable through increasing the size of an ordinary order so as to cover more than 60 days' requirements will more than offset any carrying charges applicable and leave a net balance in favor of the purchaser, which is a true indication that departure from hand to mouth buying at times may be advantageous.

Quantity Buying of Stationery Pays

Probably in no other commodity are the benefits of quantity ordering so very evident as in stationery. When it is realized what a large amount is expended annually for this one item, it should arouse every individual who is interested in effecting economies for the railroad.

It has been the practice, for example, to order 50 books of a certain form. This would be about 12 months' supply. Upon checking with the printer, it was found that by ordering 100 in each lot, the price was reduced about 44 per cent. In this case

it was not difficult to decide that this particular form should be ordered in lots of 100, since this amount was but two years' supply.

Another form is used at the rate of 100,000 annually. Previously it was customary to order 50,000 in each lot. Recently, it was found that 100,000 could be printed for a much lower price per thousand. The 50,000 lot was printed at $2.28 per thousand, while 100,000 were priced at $1.86. Thus we saved $42 on each lot of 100,000 at an expense of less than $5 carrying charges.

It is nearly always the policy to order a year's supply of a stationery form where the consumption is not over 100,000 in the case of a large, bulky form, or possibly 200,000 of a smaller size form. If but 500 are used annually, then consideration must be given to the make-up of the form. If an expensive form, it probably would be wiser to order 2000 or even 5000 occasionally.

Consider the "Extras"

There is another class of material which deserves much thought and study. Soft steel bars, bands and shapes,—bar mill sizes—all carry lump sum quantity extras or differentials, arranged on a sliding scale as shown on standard extra cards issued by all steel mills. Referring to the extras on bars and bar mill sizes of shapes we find that a lump sum quantity extra is charged as follows:

Quantities less than 4,000 lb., but not less than 2,000 lb...$3
Quantities less than 2,000 lb., but not less than 1,000 lb...$6
Quantities less than 1,000 lb.....$10

It is necessary to bear in mind these extras when ordering so as to take advantage of the minimum charge consistent with economy. It would hardly be advisable to order 4,000 lb. of a size to save the $3 extra when 2,000 lb. would be a year's supply, for the reason that the carrying charges on the investment in the extra 2,000 lb. would be some $5 to $6. However, if a normal order to cover 60 days' supply would be 50 bars of a certain item totaling 3,000 lb., taking a "lump sum extra" of $3, then this order could be changed to 70 bars, or 4,200 lb., taking the base price. For comparative purposes, let us use a price of $2.30 cwt. for the steel. The 3,000 lb. order would total $69, while 4,200 lb. would come to $96.60, or $27.60 more. Then we would be carrying an investment of $27.60 for three months. Carrying charges at 15 per cent per annum for the three months would be $1.04. Deducting this amount from the $3 saved on the purchase price, leaves a net saving of $1.96 on the transaction.

Many times the margin is greater. Suppose an order covering 60 days' requirements would be 1,000 lb. of a particular size. Using a net price of $2.30 cwt. referred to, this amounts to $23. By placing an order for 4,000 lb. of this size, totaling $92, we save on the purchase price $6 each lot ($6 quantity extra over 1,000 lb., less than 2,000 lb.). For the year we would save $24 on four lots being ordered. We have an additional investment of the difference between $23 and $92, or $69. Figuring carrying charges for 8 months at 15 per cent per annum on the $69 makes $6.90. Deducting this amount from the $24 saving on the purchase price leaves $17.10, a very substantial saving in this case.

Coil Spring Buying

The extras applying to the purchase of coil springs also are worthy of note. Here again the manufacturer uses a standard quantity extra on a sliding scale.

For example, we use 300 per year of a certain item of coil springs. This should call for a normal order of 50, covering 60 days' supply. An order of 50 takes an extra of 25 per cent. That is, if the base price of coil spring is $3.775 per cwt. we will be charged $4.71875, an extra of $.94375 cwt. Fifty springs weighing 1,740 lb. at the above price total $82.11 and 6 orders annually would make $492.66. Suppose we were to order 100 springs on each order. The extra of 10 per cent, or $.3775, brings the price to $4.1525 cwt.; therefore, 100 springs would cost $144.50. Three orders for the year would total $433.50, making a reduction of $59.16 in the purchase price of this item annually. We must deduct something for carrying charges, which would figure about .075 per cent on half of the yearly total of purchases, amounting to $16.26. Deducting this amount, we show a net saving of $42.90 annually.

The possibilities of effecting economies through quantity ordering are so great that the subject merits much thoughtful study. Satisfactory results can only be obtained by careful application of the knowledge from a thorough perusal of the stock book records as well as manufacturer's standard lists. An extra charge made by the latter is frequently a penalty for not making intelligent use of available data in determining the size of an order. Storekeepers should carefully supervise the making of purchase requisitions in order that the purchasing department may be enabled to place orders to the greatest advantage.

Products and By-Products of Purchasing

By H. W. Rolston

Statistician, purchasing department, Pennsylvania, Philadelphia, Pa.

H. W. Rolston
Chairman

A purchasing organization, whose skillful purchase of materials is augmented by an attitude which will "sell" the railroad, is an asset of vastly greater value than can be realized solely through the economical and appropriately timed delivery of supplies.

As competition grows keener, as legislative handicaps continue to hamper the freedom of operation, as the margin between net and expense narrows with distressing persistence,—the potential power of the commercial contacts of the modern purchasing agent becomes more apparent as a tangible factor in lifting the purchasing operation above a routine producing no revenue.

Consequently, as the purchasing agent's vision scans his field of opportunity, it focuses with peculiar interest upon any methods that promise an opportunity better to serve the railroad and, simultaneously, that will offer economies in operation or other definite benefits to the seller.

Co-operative Buying and Selling

The method of Periodic Purchases is a case in point. This is the plan of encouraging manufacturers to stock quantities of standard materials, for delivery over a designated period, as shall be specified on definite orders to be issued. This does not presuppose nor contemplate the erection, en masse, of arrangements to cover periods of long duration, and has no analogy to the issuance, for instance, of annual contracts for standard materials.

It is essential that this method of period purchases be operated with a caution equal to or greater than that accorded to current purchases. Obviously, the method cannot apply to any but strictly standard materials and the purchasing agent must have not only definite data as to the quantity which a given period in the immediate future will require, but must be sufficiently in touch with the purposes of his mechanical department to minimize the possibility of changed design or obsolescence, concurrent with a large stock in the hands of a manufacturer, producing embarrassment and consequent unforeseen costs.

Close contact between purchasing agent and seller here demonstrates a definite value. The purchasing agent's careful watch over the manufacturer's stock of the item concerned and his equally constant touch with stores requirements and the movements of his mechanical department are his insurance against the evils which might result from a policy less careful and vigilant.

Advantages of the Plan

The definite and tangible advantages to the railroad, accruing from such a system of periodic purchases, are several and important. The prompt delivery of material, shipped from stock, on specific orders under this arrangement, is not obliged to wait upon the manufacturers' program, and results in a consequent reduction in the number of emergency requisitions issued, due to delayed receipt of material ordered on regular requisitions. Stores and distribution costs are lowered by reason of the readiness to serve of several manufacturers and the direct shipment by the manufacturer to actual points of consumption.

Such periodic purchases readily reflect their larger quantities in lowered prices, and in addition, the railroad's inspection costs are reduced in consequence of fewer visits required by inspectors to manufacturers' works.

The office detail of the purchasing agent receives its benefit in a reduced number of inquiries, attendant upon this plan.

Helping the Seller

Were these advantages to the railroad the sole result of the periodic purchase policy, the scheme would merit the purchasing agent's careful consideration. Its co-operative advantages, however, are equally apparent. Mention has already been made of the seller's ability to use this periodic purchase plan in promoting the profitable use of slack periods in his manufacturing program. To this benefit is added the reduction in manufacturing costs of small orders. No less lucrative to the seller is the time and opportunity granted through advance knowledge of his requirements to take advantage of varying conditions in the purchase of raw materials.

The assurance of future orders, moreover, is not only of direct benefit to the manufacturer, but of benefit to industry in general through engendered confidence that the railroads are buying and contemplate a continuance of buying. Any phase of a method which shall inspire confidence in the future of business and promote assurance of persistent prosperity, immediately assumes a value which cannot be confined either to the balance sheet of the individual railroad or to that of the individual manufacturer and seller of railroad materials.

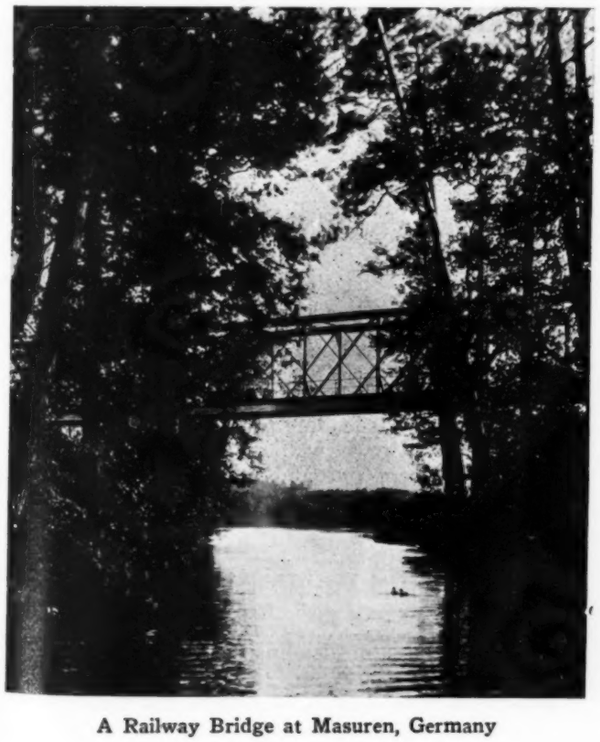
In the actual operation of the periodic purchase policy, the purchasing agent's knowledge of the conditions affecting the requirements for many standard items will enable him to make definite quantitive arrangements with the manufacturer covering equally definite periods, and, as it becomes increasingly possible to do this, and, as the manufacturers' confidence in the policy increases proportionally, the way is paved even better for their encouragement to stock standard items without the necessity of written arrangements.

Making Friends for the Railroad

This last named condition must of necessity be born of a sincerity on the part of both purchasing agent and manufacturer in their frank effort to operate the plan for mutual benefit, and it marks the real fruition of the plan.

In the operation of the periodic purchase plan, the progressive purchasing agent has not only faithfully fulfilled his obligations to his corporation, but, through his opportunities for contact with potential shippers, by creating or confirming confidence in his integrity and his sincerity of purpose and by a definite contribution made to progress in policy and business optimism, he has actually served his railroad, not only as an efficient and economical purchasing officer, but as an exponent of the railroad's desire to co-operate with other industries and as an effective salesman of the railroad's only commodity—transportation.

* * *



A Railway Bridge at Masuren, Germany

Conventionalities

Irving H. Jones is passing his new cards around as manager of railroad sales of the Pittsburgh Crucible Steel Company. He was formerly manager of railroad sales of the Central Alloy Steel Company.

Charles Riddell, manager of the Baldwin Locomotive Works at Chicago, instead of missing the convention as has been reported, was present for a few minutes yesterday while on his way home after a business appointment in Philadelphia.

The motor coaches and airplane on the Boardwalk in front of the Auditorium are getting their full share of attention. On Tuesday, a total of 1,222 people inspected the club coach displayed by the White Company, and yesterday the total topped 1,500.

With pleasure we announce the advancement to higher duties and responsibilities of Goodrich Q. Lewis, of W. H. Miner, Inc. Mr. Lewis, a week ago, was promoted from the office of mechanical engineer of the Miner organization to chief engineer.

One of the engineering officers who can always be relied upon to take in the appliance exhibits at Atlantic City is R. C. Bardwell, superintendent water service of the Chesapeake & Ohio. He has the honor this year of being chairman of the Water Service Committee of the A. R. E. A.

For the information of those who have been wondering as to the whereabouts of H. B. Oatley, vice-president of the Superheater Company, he is expected to arrive at Atlantic City either Saturday or Sunday. He will remain on the boardwalk after the close of the A. R. A. conventions to attend the annual convention of the A. S. T. M.

Robert H. Whitelegg, until recently general manager, Byer Peacock Locomotive Works, Manchester, England, is attending the conventions at Atlantic City on his first trip to this country, as the guest of George Carr and is stopping at the Marlborough-Blenheim.

By missing the convention J. H. Bendixen, vice-president of the Bettendorf Company, suffered the disappointment of breaking a continuous attendance for 25 years, except in one other case. He is unable to be present because of illness in his family.

There is some dispute as to the holder of the heavy-weight title on the boardwalk this year, but it is apparent that the heavy-weights are numerous. Outstanding among the supply men is Joseph Sinkler, general manager of the Pilot Packing Company, Inc., who tips the scales at 287 lb., while the Purchases and Stores Division can boast of over a dozen or more men in the 200-lb. class, among them J. L. Sullivan, general traveling storekeeper of the Union Pacific, with a weight of 295 lb.; J. L. Irish, general storekeeper, O. W. R. R. & N., 220 lb.; I. C.

Bon, superintendent reclamation, Wabash, 230 lb.; G. S. Genther, general storekeeper, Lehigh & New England, 228 lb.; L. P. Krampf, supply agent, Missouri Pacific, 222 lb.; A. S. McDonald, Canadian Pacific, 215 lb.; C. C. Kyle, purchasing agent, Northern Pacific, 214 lb.; J. C. Kirk, assistant general storekeeper, C. R. I. & P., 205 lb.; G. L. Leiber, superintendent reclamation, Missouri-Kansas-Texas, 200 lb., and Chairman W. Davidson, general storekeeper, Illinois Central, 210 lb. The claim is made that the Scrap Committee of this division is the heaviest committee on the grounds. In fact, it might be called the "Scrappers Committee," if size is tantamount to pugilistic power.

Friends are glad to see H. T. Bentley, retired general superintendent motive power of the Chicago & North Western, much in evidence again at the conventions. He is a past-president of the Railway Master Mechanics' Association, the International Railway Fuel Association and the Western Railway Club. He is accompanied by Mrs. Bentley.

Among the many who are expressing sincere satisfaction with the new arrangements for housing and showing the exhibits may be added the name of John C. Haswell, president of both the Pratt & Letchworth Company and the Dayton Malleable Iron Company. Mr. and Mrs. Haswell registered early in the week at the Chalfonte and will stay late. Mr. Haswell is an ardent golfer and is an early 80 player.

H. H. Laughton, assistant to vice-president in charge of stores on the Southern, who has been a regular attendant at the Purchases and Stores conventions, was missed last year at San Francisco, but the Atlantic City conventions find him again on hand, accompanied, moreover, by the bride whom he is remembered to have taken unto himself last year.

C. H. Putnam, master car builder, of the Great Northern, is accompanied by Mrs. Putnam, R. Bartholemy, assistant master car builder, and H. Harrison, general car foreman of the Western district. They have received word that President Ralph Budd has safely arrived at Cherburg, France, on his way to Russia, where he will spend three months making a study of the Russian railways for the Russian government.

The convention misses this year the familiar faces of Mr. and Mrs. John D. Hurley, who have been such regular attendants at the conventions in the past. As president of the Independent Pneumatic Tool Company, Mr. Hurley had not missed a convention since his first one at Manhatten Beach in 1905. His death last August was sorely felt by a veritable host of real friends.

There is an old saying to the effect that there is nothing new under the sun. But just to prove the contrary, many visitors are having a lot of fun with the toy electric train which is apparently operated by a "robot" hidden under the table. To have the train move forward, the dispatcher says "Go ahead, please," into a telephone receiver. It is the "please" part of the order that will intrigue the average railroad man.

A. C. Mann, vice-president in charge of purchases and stores, Illinois Central, is in a position to serve somewhat in a dual capacity this year as representative not only of the Illinois Central, but of the Hawaiian Islands, judging from the fact that he and Mrs. Mann have recently returned from a trip to the Islands. Honolulu blues? No, he has not had them but agrees that having once been to Honolulu one finds it hard to forget.

The many friends of Louis Lavoie, general purchasing agent, Canadian National, and Secretary W. J. Farrell are glad to see them looking so shipshape this year, remembering that Mr. Lavoie had the misfortune when traveling to San Francisco last year to fall victim to an illness that not only prevented his attending the convention in person, but kept him in bed for many weeks; Mr. Farrell also had a sick spell a few months ago which taxed his patience to the utmost.

Ralph S. Cooper comes to the convention this year as the new president of his company—The Independent Pneumatic Tool Company. After graduating from Cornell University, Mr. Cooper almost immediately went with this company, specializing in the railroad field. He has been a regular attendant at the conventions since 1906. His company has recently added a line of rock drills to its products, having purchased the Cochise Rock Drill Manufacturing Company of Los Angeles, Cal. Mr. Cooper is accompanied by Neil C. Hurley, brother of the late John D. Hurley and chairman of the executive committee of the company, who is attending these conventions for the first time.

Charles E. Denney, president of the Erie, is one man that knows how to tell a good story. Here is one he sprung at the opening session of the Purchases and Stores Division yesterday morning:

The wife of an Irishman came home one night and found him writing. She asked, "What are you writing?"

"I am writing the names of all the guys I can lick. I have only a few, but I started off with Duffy."

"Duffy downstairs?"

"Yes."

"I am going out for a minute."

She went down to Duffy's apartment and said, "Good evening, Mrs. Duffy."

"Hello, Mrs. Casey."

"Casey is writing upstairs."

"Writing? I didn't know he could write."

"Sure he can write. He can write the names of all the guys he can lick." She then advised Mrs. Duffy that her husband was leading the list.

Mrs. Duffy said to Mrs. Casey, "I will be back in a minute." She went out and told her husband. He went upstairs to see Casey. He said, "I understand you are writing."

"I am."

"I understand you are writing the names of all the guys you can lick."

"I am."

"I hear you have me leading off."

"I have."

"Why, you little shrimp, you can't lick me."

"All right, I will scratch your name off."

Motor Transport Division Takes up Passenger Service

Substitution of motor coaches for passenger trains, long haul highway travel and operating costs discussed —J. M. Davis speaks

THE Motor Transport Division continued yesterday what has been characterized as its "most successful and constructive meeting," with consideration of the reports of the Motor Coach Section. For the first time, reports and discussion were directed along lines which would permit the division to make definite recommendations concerning the co-ordination of railway and highway service.

Before beginning the regular program of the Motor Coach Section, A. P. Russell, chairman, announced that, for the purpose of improving future programs of the division's meetings, the general committee will meet with regional chairmen semi-annually, between scheduled meetings of the division, to discuss the progress which has been made on reports scheduled for presentation.

J. M. Davis, president of the Delaware, Lackawanna & Western, and member of the executive committee of the American Railway Association related to the Motor Transport Division, addressed the delegates briefly, pointing out the growing importance of highway transportation and the need on the part of railway executives for sound advice from the division on the problems of motor vehicles operation and competition. The present generation is highway-minded, Mr. Davis said, and motor transportation is sure to grow still further. He mentioned a recent survey which showed that 1910 motor coaches cross the Hudson river daily through the Holland tunnel and on ferries between Forty-second street and Liberty street, New York. Motor coach operators are having their troubles now, just as railway pioneers did, and the most complete success should not be expected too soon.

Motor Coach Substitutions

P. J. Neff (Missouri Pacific), chairman of the Motor Coach Section, presided during the presentation of the reports of his committee chairmen. The first topic reported upon was, "Can motor coach service be profitably substituted for branch line passenger train service?"

A number of roads were reported as successfully carrying out such substitutions. Motor coach operating costs mentioned ranged between 25 and 30 cents a mile, with train operating costs 73 cents a mile and higher. One road reported that its motor coaches, operating in replacement of train service at fares about the rail level, or slightly higher, are earning a profit on their own account, but other lines in general found that the profit from the substitution of motor coaches for trains is largely the saving of train operating costs.

It was suggested that the necessity of handling a heavy "headend traffic"—mail, baggage and express—makes substitution difficult on some branch lines. Road conditions likewise are sometimes a deterrent. Several roads reported that they have successfully met the first difficulty with motor coach equipment capable of handling a substantial amount of cargo in addition to some passengers. The possibility of the railways' losing their mail contracts if they do not provide the frequent service demanded was pointed out, mention being made of the approval by the Post Office Department of plans for a 15-ft. mail compartment, to be mounted on a motor coach chassis, in which a mail clerk could be carried to sort mail enroute.

Long Haul Coach Lines Increasing

On the question, "What is the trend and extent of long haul motor coach transportation as compared with long haul rail transportation?" reports presented showed that long haul motor coach lines are carrying increasing numbers of passengers for distances of 300 miles and more. It was stated that long haul motor coach travel is increasing more rapidly than long haul rail travel, and is increasing at a tremendous rate along natural channels of traffic. It was said that between some points there is more long haul motor coach travel, passenger for passenger, than long haul rail travel.

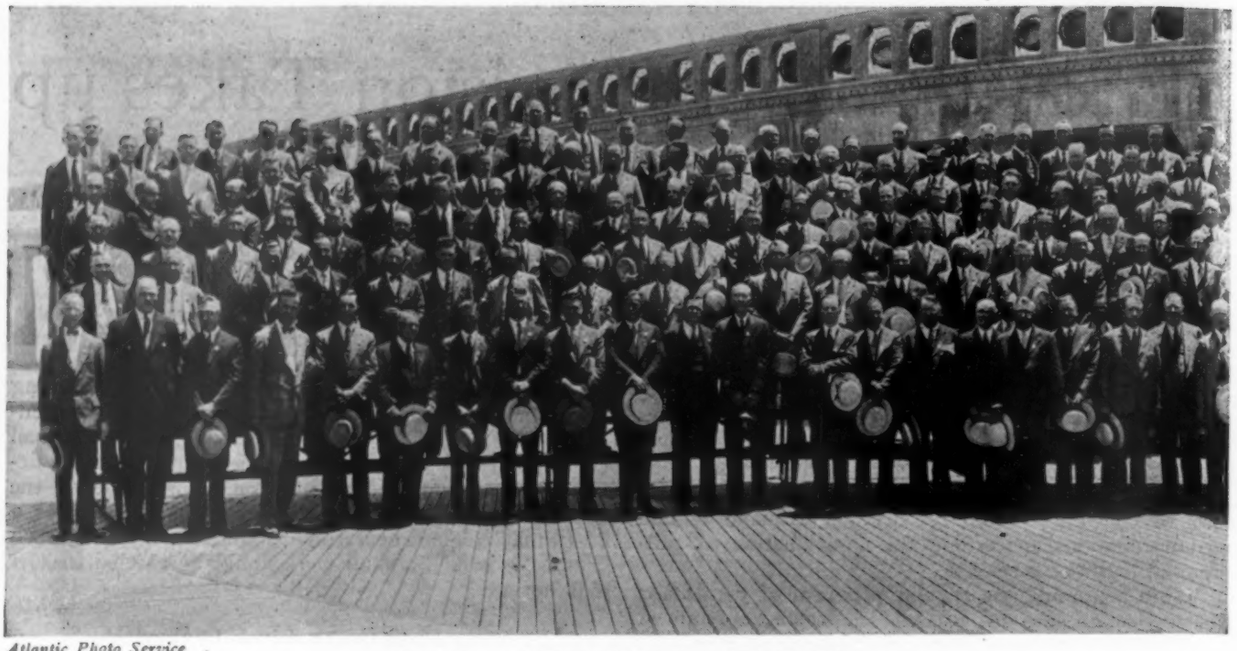
Motor Coach Operating Costs

At the afternoon session, the question of the cost per mile of motor coach operation was considered. Figures ranging from 18 cents to 33 cents per mile were reported by various roads. It was pointed out, however, that operating costs depend largely upon the size and manner of use of the equipment, and that operating cost statistics vary to some extent in accordance with the accounting method used. The accounting system devised by the American Electric Railway Association was recommended for general use. One road with considerable experience has found that the cost per mile in cents generally equals the seating capacity of the motor coach.

As the next item on the program, means of regaining lost passenger traffic were discussed. The reports centered largely about the efficacy of rate reductions, and were nearly evenly divided in favor of and against this procedure. It was suggested that the decrease in the passenger revenue of the railways in recent years may not be disproportionate to the amount of train service eliminated.

In the consideration of tickets for interline motor coach transportation, it was stated that frequent difficulties have been encountered in making collections. An attempt is being made to establish greater uniformity in practice, and mention was made of a standard interline ticket agreement recently adopted by a number of southwestern motor coach lines.

The final sessions of the Motor Transport Division will begin at 9:30 this morning in Committee Room 12. The reports of the Motor Truck Section will be heard and discussed.



Atlantic Photo Service

Purchases and Stores Officers at Atlantic City

Big Program Marks Second Day's Work of P. and S. Division

Discuss New Stock control methods and training schools and hear contest winners on Thursday

THE Purchases and Stores Division had a busy day on Thursday with a program covering the consideration of several special subjects as well as the reports from eight of its active committees The sessions opened at 9.30 A. M. with the registration of 280 members, and were featured by a description given of a new system of stock control and the reading of the winning papers in the year's contest held for the younger stores men. New subjects considered during the day were reports on handling supplies for motor coach operations, and methods of securing heavier loading of cars of company materials while the other subjects included reports on training schools for storekeepers, standardization, purchasing methods and motorized delivery. The proceedings at this meeting are presented in part as follows:

Stock Book Methods on the Lehigh Valley

How the visible card system is proving superior to standard methods explained———Savings Reported

By C. B. Tobey
General Storekeeper, Lehigh Valley, Sayre, Penna.

C. B. Tobey

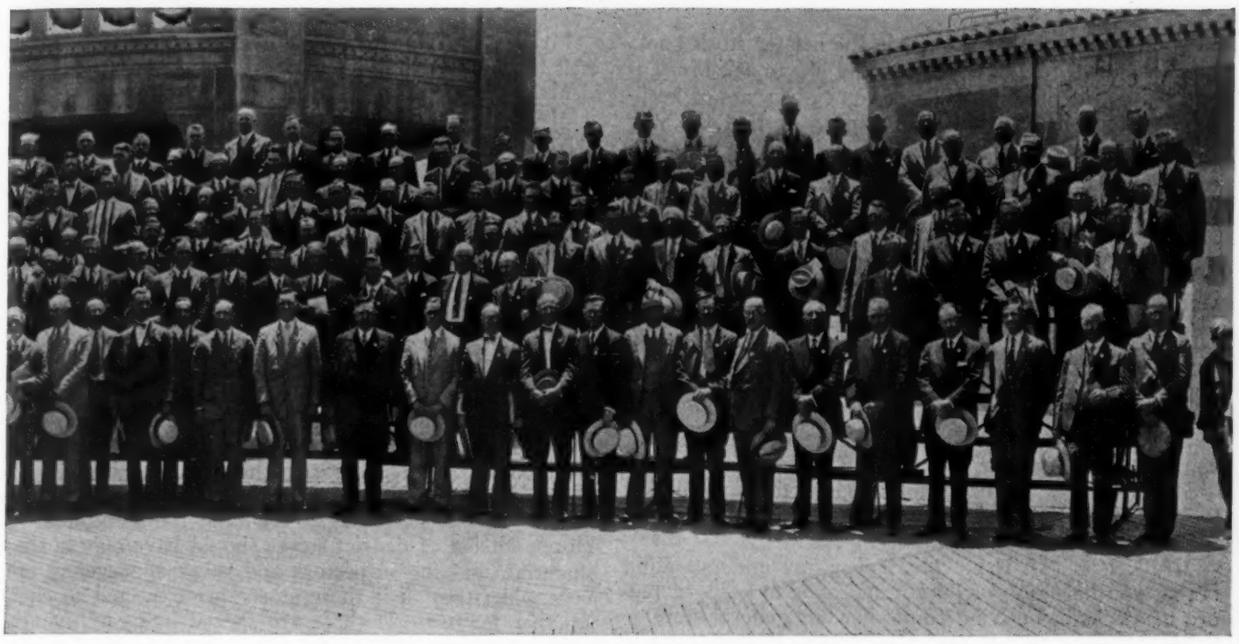
Some years ago the master stock book idea was adopted by the Association as a recommended standard method of keeping record of and controlling stocks. At the time of its adoption it was considered the best known method. This system has been all that the Association expected of it and answered our needs.

The trend in our big manufacturing plants for some time past has been toward visible card records. A visit to the plants of any of our big mercantile concerns will disclose no bulky books, such as our stock books, in operation, but instead flexible visible card records for all purposes. The railroads use visible card records for employees' service records, material prices, etc. Why not cards for stock control records also? When I learned that the Canadian National had installed such a system I visited its stores at Toronto and Montreal and was so impressed with the practicability of the idea that plans were made to adopt it, with some minor changes, for use on the Lehigh Valley.

How System Works

This visible card stock control system was put into operation on January 1st of this year and, while still new, it is already working much better and at less expense than the A. R. A. standard stock book method previously used.

The stock cards are 8 in. wide by 10 in. long and provide for an eight year record,—four years on each side. They carry spaces for the same information as any other stock record, such as quantities on hand, due, unfilled orders, used, etc. At the top of each card is a description of the item, also the material classification number and the section and the rack in which the material is stored. Spaces have also been provided for the unit of measure, the quantity, price and amount so that, if deemed advisable, the annual inventory can be taken on the stock



The Convention Attended by Four Hundred Supply Officers

cards and a photostatic copy can be made of the cards.

The cards are placed in steel panels measuring 9 in. by 18½ in. which are hinged so as to form a double panel or book. Each panel will accommodate 70 wires or stock cards, making 140 to a book. There is a ½ in. space on each panel for use in ordering material. After the stock is counted and the quantity needed to replenish the stock is marked on the card, the card is offset ½ in. so that the storekeeper, picking up the panel, can see at a glance just what items are to be ordered.

The stock is taken each month on specified dates by section stockkeepers who insert the quantities on hand, unfilled orders, etc., and also the quantities thought necessary to replenish the stock. Where additional material is needed and the amounts are set down by the stockkeeper, the cards on which it is necessary to order material are offset and the panels sent to the storekeeper for his approval. It is then simply a case of looking over only the few offset cards and checking up on the stockkeeper's justment on the quantities ordered. After the offset cards are examined and any changes in the quantities to be ordered are made, the panels with the cards still in the offset position are turned over to typists to prepare the requisitions. It is necessary for the typist to consider only the offset cards. Under the stock book system it is necessary for the storekeeper or the typist to scrutinize each page and each item to determine what needs attention.

Colored Signals

The different classifications and kinds of material are designated by a colored insert. Provision is also made to designate surplus material, special material ordered on request of some using department official and not yet drawn from stock, material made obsolete by changes in design or standards and awaiting disposition, and non-standard items returned to store stock for any reason, by inserting various colored celluloid signals which stand out prominently. We use an orange signal to designate surplus material, green signals to designate special material not yet drawn from stock, blue signals for material for which disposition is being asked and lavender signals for non-standard material. These celluloid signals can be used to designate any conditions desired, which cannot be done readily with the present stock books.

On the Lehigh Valley all surplus material is currently shipped to the general store so that practically all of the surplus material on the road is at one point. If, for any reason, it is necessary to carry any apparently surplus material at line points for protective purposes, the orange indicator is shown on the card and a notation made in the blank space at the bottom of the card as to why it is thought necessary to hold this material at that point.

Savings

With the visible card system we have been able to save considerable for stationery in maintaining the stock books, as our present forms will last for eight years instead of two. The work of the stockkeepers has been lessened by doing away with the necessity of using carbon paper and making a duplicate record and tearing out the stock book slips and sending them into a central point. We have also eliminated the necessity of maintaining a master stock book and pasting the stock book slips in it and have eliminated the checking requisitions against any central record before placing them for purchase. The storage space needed for stockbooks has been reduced about 75 per cent while the time necessary for storekeepers to go over the books when ordering and the typists when writing up requisitions has been reduced fully 50 per cent. The system has made available practically at a glance information as to surplus and special material on hand and has speeded up all the work from the taking the stock to forwarding the requisition to the purchasing agent.

It has been possible to dispense with the services of three employees. This payroll saving, together with the saving made in stationery, account for more than a 50 per cent return on the investment in cards and panels, or an annual saving of about $4,500 on an investment of about $8,200.

Discussion

The Chairman: When I asked Mr. Tobey to present this paper last March, he said, "Mr. Davidson, we haven't had this in operation long enough for me to come before the convention and present a paper." Evidently Mr. Tobey has put it into effect and knows what it is doing. That was a very fine paper and shows progress.

E. W. Peterson (Bangor & Aroostook): Did I understand Mr. Tobey right, that a one-panel card would last eight years?

Mr. Tobey: Yes.

Mr. Peterson: An active item?

Mr. Tobey: Yes. I noticed when I said that yesterday, Mr. Peterson smiled. When I was up at Montreal, Mr. Thompson showed me his layout. He showed me lots of cards in service for four years and they were still practically as good as new. We adopted for our use a really better grade of paper for the card than Mr. Thompson had. I think we are safe in saying that the cards will last that period.

Mr. Peterson: The point was not so much on the wearing out as to whether or not the size would be large enough to contain all the information required for eight years.

Mr. Tobey: Yes. It contains the same information and really a little more than your A. R. A. master stock book does. Every feature that is in the master stock book is provided for on the cards and several other fea-

tures on the cards that are not in the master stock book.

L. F. Duvall (A. C. L.): I would like to ask Mr. Tobey the cost of those cards, based on eight years of keeping the stock book against the cards. Is that the way you figure cost?

Mr. Tobey: Our initial investment on these cards was $8,200. We laid off two units of $4,000 a year. We figure the saving in stationery will amount to $500 or $600 a year.

Mr. Duvall: What is the approximate cost per thousand on an arrangement of that kind?

Mr. Tobey: These cards cost about $20 a thousand.

Mr. Duvall: Does that include the panel?

Mr. Tobey: No! The panels cost about $13.50 apiece. They hold 140 cards.

J. V. Miller (C. M. St. P. & P.): Is the card that you are using just for the monthly records?

Mr. Tobey: We have not adopted the system that the Canadian National has in effect as yet. This takes the place of the stock book only.

Mr. Nelson (U. P.): Mr. Tobey, my understanding is that you have no—or do not endeavor to keep—a record of stocks at outlying points in your general store.

Mr. Tobey: We do not, Mr. Nelson, since we put in this operation. We made it a practice that any time we get more than four months' stock, we ship it to the general store. Where it is necessary to carry a surplus item at an outside point, it is shown by an orange indicator and a notation as to why it is kept there. There are so few special items that we want to keep a running record of that we are going to put a smaller card inside of the larger card and have a monthly report on those items only made by the storekeepers at the outside points.

Mr. Nelson: The reason I raised the question, Mr. Tobey, is because it is our experience sometimes we will have a run on some particular item and we will exhaust the stock perhaps at our main points and we fall back and then look on our master stock book to see what we have elsewhere. In that way, we manage to get by.

Another question: Do I understand that each stock man has a certain number of panels that he handles?

Mr. Tobey: Yes. They are not kept with the section stock-keeper. They are kept in the office. He takes them down as he needs them.

Mr. Nelson: In other words, it is an office record more so than a stock record.

Mr. Tobey: It is both combined, but it is maintained in the office.

U. K. Hall (U. P.): In that connection, you say those cards are in the office. Personally, I don't like that idea. Is there any reason why that couldn't be outside if you wanted it?

Mr. Tobey: We are considering putting them on the outside.

J. C. Stewart (C. V.): I would like to inquire of Mr. Tobey what his monthly disbursements are, in the general store.

Mr. Tobey: About $350,000 to $400,000.

Mr. Stewart: How many miles of road do you operate?

Mr. Tobey: 1,376 miles.

C. C. Kyle (N. P.): How many store points does the $8,200 cover? How many of your stores have this system?

Mr. Tobey: Our general storehouse at Sayre, Pa., and the district storehouses at Buffalo, N. Y., Coxton, Pa., Hazleton and Easton and Packerton also. We haven't put this in at the smaller store point as yet, because we are still using up the stationery that we had left on hand of the A. R. A. stock book.

Mr. Kyle: That is a little over $1,000 a store to install this.

Mr. Tobey: That is right.

Mr. Nelson: I notice that you have provided a card for prices. Is it your intention eventually to show prices in your material cards?

Mr. Tobey: That price, quantity and amount column is set down for the purpose of taking inventory and making a photostatic copy of it instead of having the separate sheets. We do not use it in connection with the running record but in connection with the inventory plan.

Mr. Hall: I would like to ask Mr. Thompson, if the Canadian National has a master stock record of some kind which they operate.

L. C. Thompson (C. N.): We don't operate a stock book of any kind. We have been operating similar to Mr. Tobey. Our record is only good for four years, while Mr. Tobey has increased his to eight years. There is no reason why you can not run a master record. We do not find it necessary. We take the stand that all stores outside of district stores should have only current material, and the inspectors and other supervising officers when they visit these stores are expected to check up that feature. If there are special items of material that have been ordered by using departments, or have been in stock too long, they are signaled when they take stock each month and reported to the general storekeeper who reports the fact to the superintendent of motor power or other officers.

G. W. Gerber (Southern): I understand you have eight outside points where you have the cards in use. In writing up the monthly requisitions, do you consolidate the check of those eight outside points or do you consider them at all?

Mr. Tobey: We do not.

L. P. Krampf (M. P.): Mr. Thompson made the statement that he does not maintain a master stock book. I am just wondering how he transfers his materials, especially transfers in cases of emergency where engines are being held, or other equipment. What record does he maintain in his general stores in case he gets a wire or a letter and the material does not seem to be in stock? I am not only speaking of emergencies, but of the ordinary transfers of materials. You will have a surplus of items at one store that perhaps some other store may order. I want to know what means you have of knowing what materials you can transfer from one point to the other.

Mr. Thompson: We operate no general stores. We operate district stores which serve the division stores. The district stores report all surplus or inactive materials to the general storekeeper. That is taken off on a special statement after the requisitions are made up each month. The slow-moving or surplus items are signalled. The typist goes over these cards the second time to take off these lists. They make just as many copies as they possibly can. Next month they correct the copies. They will add to them or they will strike off the items that may have been transferred during the month. That cuts down and saves a lot of typing at each district store.

Mr. Krampf: Suppose your district store maintains these stock records. He is out of a particular item which he has to have for which an engine is being held. How does that district storekeeper get that item of material?

Mr. Thompson: If it is an outside point, that is, an enginehouse point, he sends his requisition or wire in to the district storekeeper. If the district storekeeper has not got it and there is some good reason why he has not got it, he wires the general storekeeper. If it is not shown on the surplus list, the general storekeeper will wire the next division storekeeper in order to get it,—

that is, if it is a stock item. But if it is something special, it is a matter to be taken up with the purchasing department immediately. We find that that occurs very seldom and for the keeping of a master stock book which would entail a lot of expense, it is not worth it. We do not have that situation to handle frequently enough.

Mr. Krampf: Then you have ideal conditions that we do not have on the Missouri Pacific. I will venture to say that you have conditions which do not obtain on 75 per cent of the railroads in the country, because we have a continuous shortage. You said a minute ago that it should not happen very often that the division storekeeper is out of material. I have been a division storekeeper for a good many years and know that it happens nearly every day that a storekeeper is short of materials. It is not his fault, either, because he bases his requirements on past consumption which we all know does not always work out.

As far as the master stock book is concerned, I can not see how you can operate a railroad, especially a large-sized railroad, without a master stock book and being able to transfer the materials from point to point as is necessary.

Mr. Thompson: We transfer very little current material between district stores.

S. E. Keillor (C. N.): As Mr. Thompson has indicated, we handle under district stores. I am located at Winnipeg and have a supply of some 22 outside divisional points from that point. Our surplus is at the district store in Winnipeg. Any of these divisional points that may have emergencies wire me instead of going to the general storekeeper. Our store is more on the order of what you might call a general store, because we supply those 22 points from that store. It is seldom that we can not meet these emergencies, due to our stock records and to the stock which we carry to meet this large demand. It is seldom that we have occasion to transfer from one district store to another in an emergency and particularly in the West where the nearest district store is 800 miles. We usually meet that demand either through our own stock or some emergency.

A. L. Sorensen, (Erie): Has any comparison of costs of photostatic methods for the annual inventory been made as compared with previous methods.

Mr. Thompson: Years ago we thought we had to make about five or six copies of inventories. Today we only photostat one copy for the comptroller. The stock record is our own record. At one time we felt that the district store keeper, the general store keeper and probably two or three others had to have copies. These sheets cost us 8 cents to photostat in our own departments. We have points, such as Winnipeg and far west points, where we have no photostatic machine. We have had some work done outside which cost us 10 cents a sheet. Some government office bids for us where they have different offices. We have a photostat machine in Montreal which has done our photostatic work for all points east of Bellville. They take care of the eastern part of the central region.

The Chairman: If any railroad has this system or a similar system, please rise. I would like to have that recorded.

Mr. Stackholm (Public Service Transport): We have had it for four years.

Mr. Montrose (Hudson Coal Co.): We have a refinement on Mr. Tobey's system. We have what is called a Brooks Visualizer. It carries 850 sheets and, as far as I see, is similar to Mr. Tobey's arrangement, which is simply a Kardex system. I consider our system superior to Mr. Tobey's, because it is more adaptable and more easily handled.

H. M. Dewart (C. V.): About two years ago I asked our comptroller what was done with an inventory after it was sent to his office. He said he usually took it and verified the extension and filed it away as a permanent record. I asked him if anybody ever looked at that record after he was done with checking it. He said that occasionally the certified accountants checked it up. I said, "We are just as much a part of the railroad as you are in your accounting department. Why copy all that information for the sake of sending it to your office? If there was a serious question they would have to go back to our records to check up as to the price and value of the material? Let us think this over for a year. We draw our inventory off our stock books in money value." We have such an arrangement for putting the price on the stock book as Mr. Tobey has pointed out on his cards. For the past two or three years we have not made out a copy of our inventory. We have simply drawn it off, showing the page number and the amount, to the total of each book, sent that to the comptroller and when he feels like having some one check it over, he sends an accountant over. They look at it and go away satisfied.

Report on Supplying Motor Coach Operations

First study of subject by the Division discloses much variety in methods
——Changes suggested

The committee, through its individual members in various parts of the country, has made a detailed survey by questionnaire and personal investigation of practices on every railroad now operating motor coaches to any extent. The recommendations are the result of this survey and the result also of surveys of large interstate motor coach companies that have grown up under separate control and that have recently become closely associated with railroads.

We find four distinct methods of purchasing and storekeeping for motor coach operations:

1. Motor coach operations handled by a separate corporation subsidiary of the railroad, with the purchases handled by the railroad purchasing agent and the stocks handled by the railroad stores forces.

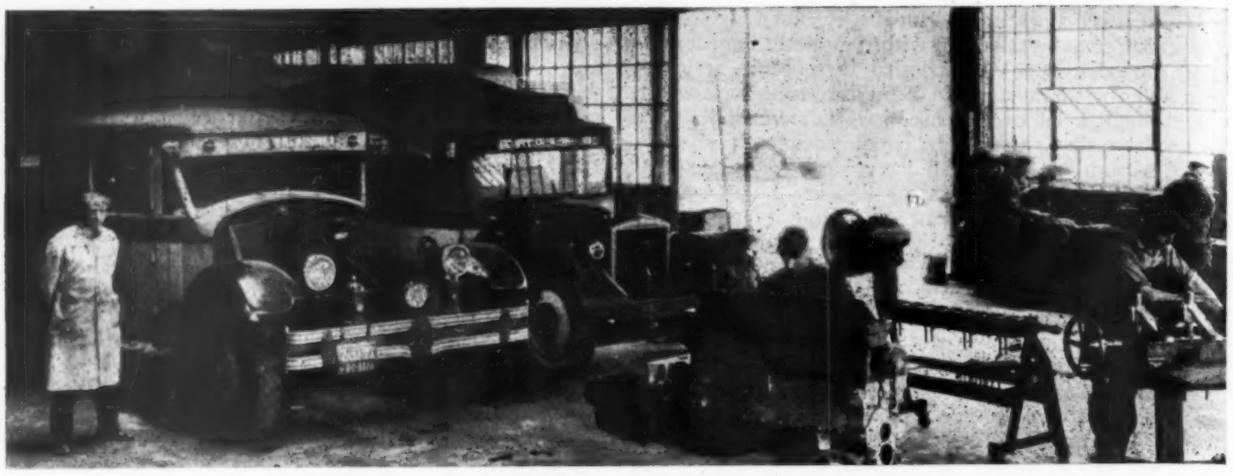
2. Purchasing and store handled by purchasing and store officers of the subsidiary motor coach company.

3. Purchases handled by railroad purchasing agent and stocks handled by motor coach maintenance and operating departments.

4. Purchasing and store matters handled by maintenance and operating officials of the subsidiary motor bus company.

Since its beginning, motor coach transportation has never ceased to surprise by its amazing development. Motor coach route mileage has increased from 345,000 miles in 1925, to 719,000 miles in 1929, and the number of passengers carried has increased for the same period from 870,000,000 to 1,973,000,000. The situation is now commanding the earnest consideration of all rail carriers in their efforts to meet this competition. The result is a steadily increasing demand for motor coach repair materials.

The committee strongly recommends that the purchasing and handling of such materials be placed under the direct control of railroad or motor coach purchasing and store officials in accordance with Method No. 1 or Method No. 2. Method No. 1 is preferable on account of the opportunity of taking full advantage of the purchasing power of the railroad. If the separate corporate identity of the motor coach company does not permit of



Repairing Motor Buses on the Southern Pacific

this organization, then Method No. 2 is recommended. Either of these methods will insure proper control of these materials, reduce obsolescence, and bring to this branch of the service the economies that have been developed by the railroads in the handling of other materials.

Stock Records

The committee has found that 50 per cent. of the railroads operating motor coaches take stock of all materials monthly and that 50 per cent. do not. Some railroads use standard stock books, some use perpetual inventory or other card records, and a few roads have no stock records whatsoever. The initial stocks on several railroads were bought in quantities recommended by manufacturers. In other cases, the practice is followed of charging all material direct from purchase bills to operating expenses immediately upon receipt.

Under such arrangements, surplus stocks can readily creep in and unless proper stock records are maintained from the start large amounts of capital will be tied up in frozen assets that can be disposed of only at scrap prices. The time to prevent this is before money is actually spent for materials that will never be used. The way to prevent it is through the use of standard stock books and actual count of stocks monthly. The stock book furnishes a brief history of the movement of every item of material, compels the exercise of greater care by employees when ordering material, and reduces the accumulation of obsolete materials, and is, therefore, recommended as standard practice.

Stock Rooms

Many garages are overcrowded and insufficient store space is provided. This results in materials being stored under work benches, along shop walls, etc. Some railroad motor coach shops allow as low as 2½ per cent of shop floor space for material stocks. The committee recommends not less than 10 per cent. Where sufficient floor space cannot be obtained otherwise, consideration should be given to the construction of mezzanine floors. The latter are not ideal but are more efficient than the practice of having material scattered throughout the shop.

Both wood and steel racks are in use. Daylight type steel racks are most generally used and are recommended because of the saving in space, better light, lower cost, and adaptability for unit piling and for the accurate count of stock. Floor tanks and self-measuring pumps are recommended to conserve space, conserve oil, and eliminate untidy conditions in shops and stores, and the use of hand lift trucks for handling heavy parts is recommended where the volume of material justifies.

Handling Spare Parts

It is the policy of most motor coach companies to keep the equipment running constantly, except when heavy body repairs are necessary. This is accomplished by stocking repaired spare units, such as motors, transmissions, rear ends, generators, starters, etc., at strategic locations. This policy presents one of the outstanding problems in connection with handling motor coach materials. The investment in such spare units often exceeds the investment in new materials, and some definite plan of control is essential.

The committee has found a repair tag (Exh. A) in use, which is attached to the unit at time of its removal from equipment and which follows it through the repair shop, enabling shop forces to charge the costs of repairs directly to car from which it is removed. When the unit reaches the store in repaired condition, or is scrapped, the repair tag showing final disposition is forwarded to the store office, where it is matched with the stub, which had previously been mailed direct to the store office at time unit was removed from equipment. This plan permits better labor distribution, eliminates the necessity of store orders covering repair work, prevents pilferage, and reduces inventory discrepancies, and is therefore recommended by the committee.

Further control of units, parts, and supplies can be accomplished by requiring the presentation of worn out parts at the store counter for exchange before issuing new parts from stock. This rule, rigidly enforced, will be reflected in reduced maintenance and repair costs.

Motor Coach Inventories

The committee endeavored to compile figures showing the total stocks of motor coach materials on hand, the total issues per month, and the average number of days' supply on hand. The data obtained was not comparable and is not submitted with this report for the following reasons:

(a) The issues, in some cases included gasoline, thus greatly reducing the number of days' supply of materials on hand.

(b) Spare repaired units on several railroads are carried in "service equipment account," instead of "material on hand account."

(c) Spare repaired units, in some cases, are carried in stock at new value, but when applied to equipment are handled as exchange, and the cost of the repairs only being charged out, which results in unreliable turnover figures.

(d) Certain railroads advised that information was not available, or not available for publication.

These conditions indicate the necessity of more uniform methods and more intensive analysis of stock balances as a safeguard against excessive stocks and the accumulation of obsolete materials.

Form	Form
Shop	
Off Car No.	Off Car No.
Article	Article
Date	Date
Man	Man
DISPOSITION	DISPOSITION
Junked	Junked
Overhauled	Overhauled
TO { Car No. Req. No.	TO { Car No. Req. No.
Stock Room 192	Stock Room 192
Signed	Signed

Exhibit A—A Repair Tag which Follows the Material

Material Classifications

Consideration has been given to the necessity of a material classification for motor coach materials, and the committee recommends the adoption of the following as standard classification:

1. Tires.
2. Gasoline.
3. Lubricating oils and greases.
4. Bearings, motors and motor parts.
5. Axles, brakes, carburetors, drive lines, radiators, transmissions, wheels and pa ts.
6. All other materials.

This recommendation is made primarily for the use of affiliated companies with separate stock balances. In cases where motor coach stocks are carried with other railroad stocks, the present railroad material classification can be used if considered desirable.

Reclaiming Oils

Attention is directed to the fact that several large motor coach companies are reclaiming lubricating oils. This practice is not in an experimental stage; it has stood the test of time and large savings in lubrication costs are being made.

Simplification

The committee finds that there is a field for simplification of motor coach materials. One railroad reports elimination of three sizes of leaf springs by making certain minor changes in body construction of different types of cars.

Tire mileage contracts, in some cases including tire repair service, are in effect on a number of railroads. While this arrangement reduces the investment in materials, a decision as to the most economical arrangement can only be made by each company independently, because of local conditions, types of equipment, etc.

Consignment Stocks

The practice of carrying consignment stocks on hand is not recommended. This plan tends to encourage the use of new materials rather than to r air old parts to the fullest extent possible.

Store Delivery

While store delivery is not generally in effect and is probably not necessary in small shops, this system is in use in one large repair shop comprising 45,000 sq. ft., and has resulted in saving considerable time of mechanics through delivery of materials from store counter direct to the job by a lower rated store employee.

The committee recommends that small hand tools, electric drills, jacks, welding torches, and similar tools, when not in actual use, be kept in the store, and issued only upon the presentation of a tag or check bearing the mechanic's number. This plan prevents pilferage of tools, reduces the possibility of an over-supply of tools, and can usually be handled by regular store counter man without extra expense.

On account of the adaptability of many motor coach materials to private uses, it is recommended, at locations where the volume of work is not sufficient to justify a local storekeeper, that a certain employee be assigned full responsibility for handling and protecting the stock of materials. This arrangement will also reduce the inventory shortages by preventing the use of material without a proper charge being made.

The report is signed by J. C. Neph (chairman), purchasing agent and general storekeeper, Pacific Transportation Securities, Inc.; G. W. Alexander, general storekeeper, Central of Georgia; P. L. Grammer, assistant purchasing agent, Pennsylvania; S. A. Hayden, chief clerk to general storekeeper, Missouri-Kansas-Texas; W. J. Hiner, purchasing agent, Cleveland, Cincinnati, Chicago & St. Louis; W. M. Hinkey, district storekeeper, Baltimore & Ohio; G. J. Hunter, traveling material supervisor, Atchison, Toeko & Santa Fe; L. P. Krampf, supply agent, Missouri Pacific; R. D. Long, assistant general storekeeper, Chicago, Burlington & Quincy; C. H. McGill, supply train storekeeper, New York, New Haven & Hartford; Frank McGrath, traveling storekeeper, Boston & Maine; J. L. Sullivan, general traveling storekeeper, Union Pacific System; E. D. Toye, general storekeeper, Canadian National; A. S. McKelligon, (chairman ex-officio), general storekeeper, Southern Pacific.

Discussion

In the absence of the chairman, J. C. Neph, the report was presented by L. P. Krampf (M. P.).

C. B. Tobey (L. V.): This is an excellent report on a new subject. One change should be made. Under the heading Material Classification, there is a statement: "In cases where motor coach stocks are carried with other railroad stocks, the present railroad material classification can be used, if considered desirable." It should be changed to read: "In cases where motor coach stocks are carried with other railroad stocks, the present railroad material classification should be followed. I make a motion to that effect."

The motion was seconded.

Mr. Krampf (M. P.) Why is it necessary to say "can" instead of "should?"

Mr. Tobey: We have adopted a standard material classification for railroad stocks. If the material is carried with other railroad stocks, we should follow out the railroad classification and not allow any leeway to deviate from it.

The motion to change was carried.

C. D. Baldwin (Bangor & Aroostook): If we should adopt this paper as presented it means that there will be six more classifications added. Yesterday morning, we spent an hour or more here discussing material classifications over a very much smaller item than this. It would seem to me that this paragraph should be left out of the report, if adopted, and referred to next year's Committee on Material Classifications.

Mr. Tobey: The committee's report is all right in that respect. They only recommend the adoption of the six classes outlined primarily for the use of affiliated companies. These affiliated companies would have no use for the standard railroad classification. My point is that if this material is carried with railroad stocks then the railroad classification should be used.

Mr. Krampf: This is our first report. We have gotten up this classification, and it perhaps does not cover all the classes. But, future committees or the committee on classifications can add the necessary refinements.

As far as Mr. Baldwin's statement is concerned, I mention in my report that we adopt these six classes. I think we will eventually have to adopt a separate classification for motor bus materials, or add it as an adjunct to our present classification.

O. Nelson (U. P.): This is a new subject. Why not start out cautiously. We already have a classification and I am sure that nearly every item in connection with motor buses will fit in. It has already been the practice of subdividing some of our classes, and I see no reason why a subdivision cannot be made for motor bus materials. Rather than go ahead and adopt a separate classification at this time, it would be better if we took another year to look into it.

U. K. Hall (U. P.): Mr. Nelson and I fight so much that we can't even stop when we come to a convention. I agree entirely with the committee. I can't say that I agree with this classification. It is a new subject. If we adopt a classification and get it started, then the committee in later years can develop it. We have stores for buses that are 200 to 300 miles from our railroad. Our material classification as used by the A. R. A. is absolutely worthless for the materials used in these buses. We might just as well give them the classification of material used by Wanamaker's store as to give these bus lines the regular railroad material classification. They are for entirely different purposes.

H. C. Stevens (Wabash): It has been a long time since Mr. Hall and I have agreed on the floor of this convention. I don't think we want to get this confused with the railroad classification. The recommendations of the committee are for the affiliated companies, and at the

present movement have nothing to do with our railroad classification. In that respect, I think the report is all right.

The Chairman: The Chair is glad that this came out. I was asked a lot of questions about it. After reading this a second time, I see it is optional. I was misled in it. I think if Mr. Baldwin will read that, he will consider withdrawing the motion. It is only for companies that carry motor bus materials.

Mr. Baldwin (Bangor and Aroostook): I think I will let it come to a vote.

[*The motion to refer the question to next year's committee was lost following which the report was accepted and the committee excused.*

Report on Purchasing Office Methods

Price indices held justified——National telegraphic code advocated——Materials inspection emphasized

W. W. Griswold
Chairman

In connection with the recommendation included in last year's committee report and in order to emphasize the value of price index studies, an illustration is given in the table of fluctuations in price indices of ten items, using the prices for December, 1926, as 100.

It is a fact that any change in the price of a basic commodity affects all commodities of that group, regardless of the condition that made the change necessary. Therefore, some record should be maintained in the purchasing agent's office that will indicate to what extent a change in any price affects other commodities. The Price Index is suggested as the most economical method to record this information.

	End of December				1930					
Item	1926	1927	1928	1929	Jan.	Feb.	Mar. 7	Mar. 14	Mar. 21	Mar. 28
A	100	77	74	73	73	73	73	73	73	73
B	100	88	93	93	90	90	90	90	90	90
C	100	85	88	92	92	92	92	92	92	92
D	100	100	93	93	93	93	93	93	93	93
E	100	96	96	92	92	92	92	92	89	89
F	100	100	100	100	80	80	80	80	80	80
G	100	86	91	132	132	132	132	132	132	132
H	100	76	65	71	71	71	71	71	71	71
J	100	102	99	106	106	106	106	106	106	106
K	100	76	76	72	72	72	72	72	72	72

It is recommended that the items presented at the 1929 convention be studied carefully with the thought that in 1931 all members will have an intimate knowledge of a Price Index of this kind and the benefits to be derived thereby.

Cash Discounts

Cash discounts should be carefully watched with the view of taking every possible advantage, especially by insisting that all invoices show the terms of payment. The committee further suggests that all purchase orders bear a notation that invoices not showing terms of purchase will be returned to the vendor for completion.

The committee again emphasizes the importance of a general use of the Simplified Invoice Form. No changes are now contemplated in the wording or arrangement of this form.

It is recommended for the purpose of economy that the following telegraphic code be established between railroad purchasing and stores departments and sellers, to be known as

A. R. A. PURCHASES AND STORES TELEGRAPHIC CODE

Ordering Material

ACTON	Ship at once by.....Express to Storekeeper..... Wire date you will ship. Confirming order No..... follows.
ADAIR	Ship at once by freight to Storekeeper..... Wire date you will ship. Confirming order No.....follows.
AKRON	Ship at once by parcel post to Storekeeper..... Wire date you will ship. Confirming order No.....follows.
ALLADDIN	Ship at once to Storekeeper.....by.....Express, balance by freight. Wire date you will ship. Confirming order.....follows.

Hurrying Material

ALBA	We have no shipping date on order.....given you by wire..... Please rush reply by wire at once.
ALLEN	We are badly in need of.....on order..... Ship by.....Express, advising shipping date by wire.
ALMADEN	We are badly in need of.....on order..... Ship by freight, advising shipping date by wire.
ALPHA	We are badly in need of.....on order..... Ship by.....Express, advising shipping date by special delivery letter.
ALVERTON	We are badly in need of.....on order..... Ship by freight, advising shipping date by special delivery letter.
AMES	We have not received reply to hurry on order..... Wire shipping date.
ANITA	We have not received reply to hurry on order..... Advise shipping date by special delivery letter.
ANTRIM	Did you ship order.....on..... as promised? Wire reply.
AQUA	Advise car number and date of shipment of order.....
ARCADE	Please have inspected and ship at once.....on order ..... Wire shipping date.

Reply of Shipper

ARDEN	We shipped your order.....by express on.....
ARNOLD	We will ship your order.....by express on.....
ARTHUR	We shipped your order.....by freight on.....
AUBURN	We will ship your order.....by freight on.....
AURA	We shipped your order.....by parcel post on.....
AVA	We will ship your order.....by parcel post on.....
AVON	Order.....not received. Send copy.

Note: (1) The above in no way waives any part of our specifications. Any modification will be distinctly mentioned in our messages.

(2) In replying, it will not be necessary to refer to dates of our telegrams. Our order number will be sufficient.

Office Equipment

The committee recommends that purchasing department heads continue to familiarize themselves with the different improvements in office equipment and filing systems for purchasing agents' offices.

Trade Discounts

It is recommended that the General Committee take up vigorously with the U. S. Department of Commerce the desirability of having all selling companies quote **net** discounts, also net prices where practicable, instead of chain discounts as is now done in many cases.

Purchasing Locally

It is recommended that the purchasing of material locally be prohibited as far as practicable, except upon definite authority obtained from the purchasing department.

Inspection of Material

The committee urges all members to follow up thoroughly the inspection of all material, particularly where purchases are made to certain specifications, with the view of knowing definitely before passing an invoice for payment that the material has been actually inspected and found to be satisfactory.

The report is signed by W. W. Griswold (chairman), purchasing agent, Wheeling & Lake Erie; B. A. Aikens, purchasing agent, Michigan Central; W. E. Evans, purchasing agent, Canadian National Railways; H. M. Dewart, purchasing agent, Central Vermont; T. J. Galligan, general correspondence clerk, Atchison, Topeka & Santa Fe; A. V. R. Gilbert, purchasing agent, Atlanta, Birmingham & Coast Railroad; J. W. Hagerty, general supervisor, purchasing agents office, Pennsylvania; C. C. Hubbell, purchasing agent, Delaware, Lackawanna & Western; A. N. Laret, assistant to vice-president, St. Louis-San Francisco Railway; R. L. Tindal, purchasing agent, New York, Chicago & St. Louis; F. S. Austin (chairman ex-officio), purchasing agent, Boston & Albany.

Discussion

P. L. Grammer (Penna.): I don't know how many roads are keeping price indices as recommended by the committee, neither do I know how many roads may have been deterred from keeping such a reord by the thought that any information shown by such a record would be readily available from trade papers

and statistical bureaus and the like. Those who have not kept a record of this kind, might like to know that we have found such a record increasingly valuable. We have had for several years, a record of probably 102 items of material. This record gives us instantly, the price trend through a period of years, tabulated on a weekly basis. It is a very convenient record at all times. Further than that, the record stimulates studies of material where fluctuations in prices have occurred at various times. We have found that things which we might otherwise have missed, have been called to our attention by this record.

A. W. Munster (B. & M.): I don't think that the railroads are doing as much as they should in furthering the use of the simplified invoice form. We have been working strenuously on it for the last two years and big oil companies and other large companies say it is the first time they have been approached on the use of this form. Other associations are working toward the use of this simplified invoice form. I feel that a lot of railroads don't realize that they have an obligation to adopt the form as standard.

The Chairman: We would like to have a standing vote of the roads using this simplified invoice.

The number of roads responding was 20.

Chairman Griswold, (W. & L. E.): In the 1927 report, the committee quoted a ruling made by the Department of Commerce, Division of Simplified Practice, recommending the simplified invoice for two years'—from February 16, 1927 to February 16, 1929. Previous to that, the standard—what was known as the National Standard Form, had been used. We have now used it approximately three years. I am told that there are no changes recommended in its wording by the Division of Simplified Practice, so we feel that we should ask all of the companies from whom we buy to adopt this in place of any other form. It is simple and easy to handle the accounting. We heartily recommend it.

The Chairman: I would like to hear from Mr. Woodson, if he is in the room.

E. R. Woodson (Railway Accounting Officers' Association): I am a member of the Standing Committee of the Department of Commerce on this form. The idea of the simplified invoice form is to save the expense to the railroads of their distributing to the vendors, the so-called customer invoice. This applies not only to railroads but also to large industrial corporations who send out with their purchasing orders, or have been sending out in the past with their purchasing orders, their own invoice forms to be filled out by the vendor. Where the concern sends out its own form to be filled out by the vendor, it, of course, gets the advantage of having all of its bills made on one form, and also the advantage of uniformity, but picture the situation of the poor vendor with hundreds of customers—every one of them with a different invoice form. Where he is doing business with all of these customers, or with any substantial number of them, in volume, it is necessary for the vendor to keep stock of all these different forms. There is considerable difficulty in filling out the different forms, and so on.

Therefore, as a means of cooperation between the vendor and the purchaser, whether it be railroad or industrial corporations, the simplified invoice form was adopted. The purpose of it was to have the vendor use that as his own form. Railroads, of course, are interested in this question primarily as purchasers or as customers of those concerns that sell. The complaint made by some of these industrial concerns that sell to the railroads as well as to others, is that they have adopted the simplified invoice form; they render all of their bills on that form. They stand ready to support the movement in every way they can, but they complain that some railroads still send their own customer invoice forms to be filled out by them, and still require them to stock them, so that they are still undergoing the inconvenience, the expense, and so on, incident to having to deal with these varying and rather numerous customer invoices.

In view of the advantage to the railroads of getting all of their invoice forms on this one form, it would seem pertinent to ascertain why some railroads continue to send their own customer forms. Is it because of the particular concerns that they happen to deal with will not use the simplified form? If so, there is an opportunity there for a campaign with those particular concerns.

On the other hand, if it is a matter of individual preference with that particular road as to its own invoice form, that, of couse, is a matter for the road to decide for itself.

On the other hand, if there is something wrong with the simplified form—some need that it does not fulfill, we are willing to have it brought out. The situation, therefore, is that the railroads stand in the position of getting all the advantage, merely by cooperation with the vendor by indicating that they will accept invoices rendered on the simplified invoice form. Many of them do this now. Many of them have been doing it for some time, merely stamping or printing on their purchase orders, a notation to the effect that the invoice covering this order must be rendered on the simplified invoice form.

In that way they have eliminated the burden of distributing their own invoice forms to the vendors, and they cooperate very decidedly with the vendor by saving him a great deal of trouble, nuisance and annoyance.

C. D. Baldwin (Ban. & Ar.): I would like to say for Mr. Woodson's information that the trouble is not all on the side of the railroads. When this matter came up a few years ago, of a standard invoice form, we adopted it, although we had to give up a pet form of our own that we thought a great deal of and that just suited. But in order to be in line with the other, and to help along the whole proposition, we changed and agreed to accept the standard invoice form. We hadn't gotten started on that, when the simplified invoice form came up. We just got nicely going on the standard.

Still, in order to be in line with progress, we adopted the simplified invoice form. Our experience has been that a good many of the vendors do not have that form and do not know what it is. We have had people write to us and ask us what we meant by the simplified invoice form. So we found it necessary to print our own simplified invoice form and send them out and as fast as we found some concern that did have that form, we stopped sending them our form and accepted theirs.

We have had a good deal of correspondence about it. We have sent out circulars and still there are a lot of these concerns, as I said, who do not know what the simplified invoice form is.

Personally, I like our own form as well if not a good deal better than the simplified invoice form. It is all uniform. It is exactly one size. Now we get them all sizes. The simplified invoice form is allowed, I think, in three different sizes. We get invoices that have one item on the big form; it is really ridiculous to see the waste of paper.

It seems to me that it has to be a process of education with the vendors. If they want to save money, they should use the short instead of the long form.

W. W. Griswold (C. R. I. & P.): When the A. R. A. recommended the adoption of the standard invoice form, the Rock Island used that form. When they also recommended the simplified form, we followed in the footsteps of the association in that recommendation. At one time we had our own form and furnished something like 100,000 sets in a year. Since the adoption of the simplified form, we are required today to furnish less than 15,000 a year. We are saving our printing bill. Our contract department has accepted the simplified form. I don't think Mr. Reed has had any trouble with the vendors in getting them to use the simplified form. We also encourage all our printers who print for the trade, to furnish and use it.

Mr. Reed: The majority of the concerns that do business with railroads in the west, use the simplified form. I would say 90 per cent of our invoices come in on the regular form without any difficulty. The only ones that do not use it are the small concerns with whom we do very little business.

Mr. Griswold: It would be interesting for us to hear from Mr. Woodson as to why the Accounting Association cannot also adopt the simplified form for collection of invoices made by the railroads. It would help to support our cause to get sellers to use them.

Mr. Woodson: That is a question that I had propounded to me within the Standing Committee of the Department of Commerce. The answer I give you here this morning is substantially the same as I gave to that committee: The railroads are engaged primarily in rendering a service, and the simplified invoice is not adaptable to service corporations. It is not adaptable to such utilities as the electric light company, nor is it adaptable to the service bills rendered by railroads.

I find myself very much in sympathy with everything that Mr. Baldwin says, which may be somewhat surprising to him. Everything that he said regarding the disadvantages of changing from the national standard invoice to the simplified invoice was anticipated and I argued myself blue in the face in connection with those very things before the simplified invoice was adopted. The committee, therefore, went to the simplified invoice and it was adopted in the Department of Commerce.

D. V. Fraser (M. K. T.): As regards the simplified form, I want to call attention to the paragraph on page four regarding purchases. I know what the committee had in mind, but in order to amplify that paragraph, I want to recommend the inclusion of the words "by other than authorized agents" after the word "locally" in the first line. In doing so, I want to clear up any questions that may be in the minds of manufacturers in reference to local points. We do not have any reason for not purchasing from them, but I think if we put those words in, it will amplify it.

Mr. Griswold: We will make that correction.

C. D. Young (Penn.): I wanted to speak on the same paragraph. The practice of our railroad is to prohibit purchasing except through the purchasing department. I am rather astonished at this suggestion from the purchasing committee. There is no authority on our railroad for purchasing except through the purchasing department, except in cases of extreme emergency when telephone communication with the purchasing department is not possible. I think that ought to be practiced on other railroads if you are really going to get the benefits of best markets and best deliveries. We did have permission for local purchasing outside of extreme emergencies at one time. A study of such purchases indicated pretty clearly that the average cost was about 20 per cent more than if the purchase were arranged through the purchasing department and when it was called to the attention of the management, the practice was prohibited.

The committee has made an excellent suggestion on page three regarding the adoption of a telegraphic code for ordering, hurrying and shipping. They have not indicated in this recommendation how it is to be carried out. I am pretty sure that if a seller got a telegram on "Acton," he would not know what we are talking about and we would probably get a telephone call to find out what the message meant.

Just how does the committee propose to put this telegraphic code into practice? We might put it on the back of a purchase order, or make it a part of the order, for a number of years so that the seller would be apprised of our code.

I would also like to ask the committee if they reviewed the code of the American Railway Association to see that it was such that it would not conflict with ours.

J. W. Hagerty, (Penna.): First, the code words do not conflict with the telegraphic code. It was proposed that each railroad would prepare the code or solicit the firms they buy from to use this code in answering and handling requests from the purchasing agent. That has been carried out on the Pennsylvania very successfully with some 500 firms.

Mr. Young: Yes, but it did not tell us how it was done. He said it was carried out. Why don't we have a plan in our recommendation so that all the railroads will have a good plan to work to and that the code will be generally known?

Mr. Griswold: I believe that Mr. Farrell, the Secretary, has, or can, arrange to keep this standing and it was with the understanding that the roads could get as many copies as desired of a code if we proposed to make this the standard A. R. A. Division VI Purchasing Stores Telegraphic Code and circularize that, send copies with the proper communication to the firms with whom the particular road is dealing. That will bring out the purpose of the code and how it is to be used. Is that true, Mr. Farrell?

Mr. Farrell: That is correct.

Mr. Baldwin: I was much in sympathy with the remarks of Mr. Young about prohibiting purchasing along the line. I think all that he said is true and it ought to be emphasized on every road. I understand the object of the recommendations that we make here is to hold up an ideal so that every railroad may aspire to it as far as their local conditions will warrant. With that thought in mind, I would like to ask the chairman of this committee if he would not be willing to leave out of this paragraph the words, "as far as practicable". That leaves a big loophole. What is practicable for one road is not on another according to the rules that are laid down and the way they are in force. I think that would help this recommendation very much if we could leave out those four words.

Mr. Griswold: I believe that with the addition of Mr. Frazer's clause we might very properly leave out the words "as far as practicable". In other words, the paragraph would then read, "It is recommended that the purchasing of material locally by other than authorized agents be prohibited except upon definite authority obtained from the purchasing department".

E. A. Clifford (C. & N. W.): I would suggest that the committee consider the idea of eliminating that paragraph entirely. It seems to me that a report carrying that paragraph is an admission that some railroads practice the idea of purchasing outside of the regular organized purchasing department.

Mr. Griswold: This was one of the items that was suggested to our committee for consideration this year, the idea being to bring that point out where there were abuses of that kind. It would simply be brought to the attention of the members that it should not be tolerated. I do not think that it particularly shows a weakness. It simply is emphasizing something that should be followed. We will not accept Mr. Clifford's suggestion.

Mr. Woodson: Will you permit me to make an additional comment about simplified invoices? It looks like a large order to campaign with all of the vendors to adopt a simplified invoice. Perhaps it might be practical for them to have some idea of the extent of the campaigns that have already been conducted in that connection.

This simplified invoice has been adopted by the United States government. The comptroller general specified it as one of the accounting forms to be rendered. One of the departments of the government, a very large purchaser, the Navy Department, will not accept bills on any other form, regardless how small the vendor is, he must use that invoice to make his bills against the Navy Department.

There are a number of printing concerns throughout the country that stock this form. They stock it in blank and print the name of the vendor in. The names of those printers are available at the National Association of Purchasing Agents. Those vendors who do not at present use this form find it necessary to purchase from those particular printers in order to render their bills to concerns that require the simplified invoice.

The General Electric Company pursues a similar plan. They specify that all the invoices rendered must be on the simplified form. The Westinghouse Electric and Manufacturing Company is constantly conducting a campaign and requires all bills to be on the simplified invoice form.

This is not alone a railroad proposition. The National Association of Purchasing Agents for some years have been conducting campaigns. They have a membership of some several thousands of purchasing agents. They are always urging the people that they purchase from to use the simplified invoice. The association has a large supply of circulars in the nature of propaganda for the use of this form and I am sure they will be glad to furnish them to any railroad that wanted to use them.

The form has been approved by the National Association of Cost Accountants and by various industrial commercial organizations. There has been, as I have already suggested to you, an extensive and intensive campaign among the vendors of various kinds in the country. With this somewhat fertile field already exploited, there is and should be some relatively simple method for any particular railroad not already having done so, to reach its particular vendors.

On motion regularly made and seconded, it was voted to accept the report.

Report on Stationery Buying and Printing

Better methods credited with ten per cent reduction in costs——
Economy of typewriter hospitals in doubt

C. C. Anderson
Chairman

The expenditures for stationery and printing by Class 1 railroads during the past three years, are as follows:

1926—$28,418,710.00
1927— 26,840,000.00
1928— 25,638,000.00.

There was a decrease of $1,578,710.00, or 5½ per cent., during the year 1927 over the year 1926, and a decrease of $1,202,000.00, or 5 per cent., during the year of 1928 over the year of 1927, making a total decrease for the three-year period of $2,780,710.00, or about 10 per cent.

In order that the most economical results may be obtained in printing forms, the committee recommends:

First: That all forms be made as small as consistent and that will cut from standard papers without waste. It is recommended that railroads consider the 8 in. by 10½ in. size, in lieu of the 8½ in. by 11 in. size.

Second: There should be a Form Committee on every railroad to pass on every form required, considering size, paper, and the need of the form, whether such form would obsolete a form now in use, or if it could be consolidated with some other form.

Third: Paper for forms should be determined by giving special attention to the use, length of time required to hold in files, and whether it is to be prepared with pencil, pen, typewriter, or with duplicator or mimeograph. Substance No. 14 and No. 16 paper can be used satisfactorily on the majority of railroad forms, and where thinner paper is necessary a No. 8 Substance Manifold is recommended. The more forms that can be placed on the same grade and weight of paper the larger will be the saving.

Gang Printing

Forms in quantities of from 5,000 to 50,000 are recommended for combination printing, as savings to be made run from 10 per cent. to 40 per cent. While there are a number of combination printers who specialize in group printing and can quote low prices, it is incumbent on the buyer of railroad printing to see that his forms are grouped for combination printing when sending out inquiries for prices, in order to secure the most effective results.

Recommended Standards

The committee recommends the following miscellaneous stationery, such items being in common use on all railroads:

Blank Papers: No printed letterheads, memorandum blanks or telegraph blanks should be used between departments of a

Stationery Storekeeping on the New York Central at Collinwood, Ohio

railroad. An 8½ in. by 11 in., or 8 in. by 10½ in. size should not be used where a half size or two-third size sheet would answer. A member line showed a saving of $5,000 per year on plain letterhead paper based on 40,000,000 sheets by reducing from size 8½ in. by 11 in. to 8 in. by 10½ in., a saving of paper of 1½ lb. per ream. Mimeograph paper should not be more than a No. 16 Substance weight.

Envelopes: It has been found that Kraft paper is 35 per cent. stronger than manila and it is accordingly recommended for all envelopes. A lighter weight Kraft sheet can be used and it has been found that envelopes are priced lower accordingly.

The use of a repeat envelope has saved thousands of dollars for the railroads. A standard form has been recommended for general use, as follows:

"Size No. 10, ungummed flap, punched two holes, stock 20 lb. Substance No. 1 Sulphite Kraft, printed one side, with space for use twelve times."

Pins: Pins should be confined to size No. 4 in steel, purchased in one-fourth pound boxes, and in papers. Where practicable, pins in papers should be furnished.

Carbon: Carbon paper should be distributed in envelopes of 25 sheets, with instructions on the envelopes as follows:

1. Do not remove any sheets from package except as needed.
2. Do not handle carbon roughly. It is delicate and easily destroyed.

In the Stationery Store of the M-K-T at Parsons, Kan.

3. Do not use typewriter carbon where pencil carbon will answer.
4. Do not place carbon paper in receptacles near heated surfaces.
5. Do not order greater quantity than is required and get from each sheet at least fifty impressions.

Powdered Ink: Experiments dating back fifteen years demonstrate that powdered ink from reputable concerns is satisfactory and effects a large saving in purchasing and distributing.

Powdered Mucilage: Powdered mucilage is beyond the experimental stage and is being successfully used on a number of railroads. It is economical and easy to distribute.

Repairs to Typewriters

The committee investigated a number of Class 1 railroads, and found that a number of railroads were getting equally as good results by contracting for their repairs as those operating their own shops. However, the committee feels that more time and study is necessary before any definite recommendations can be made, and it is hoped that next year's committee will give further time and study to this subject.

The report is signed by C. C. Anderson (chairman), stationer, Northern Pacific; F. Blanchard, Jr., stationery storekeeper, Baltimore & Ohio; H. C. Dawson, stationery storekeeper, Mobile & Ohio; Vincent Erb, stationery storekeeper, Reading; W. W. Griswold, stationer, Chicago, Rock Island & Pacific; J. M. Hamilton, stationer, Wabash; C. Reuthinger, stationery storekeeper, Missouri-Kansas-Texas lines; W. R. F. Whaley, stationery storekeeper, Pennsylvania; C. S. Williams, stationery storekeeper, Southern Pacific lines, T. & L. lines; H. O. Wilson, stationery agent, Canadian Pacific; W. B. Hall (chairman ex-officio), purchasing agent, Denver & Rio Grande Western.

Discussion

G. Kefer (Penna.): One of the most important parts of this paper deals with the standardization of forms and grades of papers. The importance of this matter is illustrated by the fact that Mr. Aishton made particular mention of it yesterday in his address. It is estimated that approximately five billion sheets of letter-size paper are used on American railroads per year. Should the size be changed from 8½ in. by 11 in. to 8 in. by 10½ in., the saving per year would be approximately 50 million sheets. If the size were changed from 8½ in. by 11 in. to 7½ in. by 9½ in., the saving would be approximately 120 million sheets per year.

In view of the fact that the former committee recommended the size of 7½ in. by 9½ in., some railroads have gone to this size of paper and due, also, to the fact that the committee had some very good reason for changing this size, I think it would be interesting if the committee would elaborate as to why they changed this size.

Chairman C. C. Anderson (N. P.): We did that because the sheets 8½ in. by 10 in. are cut from a stock size sheet. Some of the members felt that the 7½ in. by 9½ in. sheet would have to be cut out of a 19 in. by 30 in. sheet, which is not a stock size, and they would have considerable difficulty in securing the paper. I doubt very much if they would have this, for the reason that we have always been able to get any size paper that we cared to get.

E. W. Peterson (Bangor and Aroostock): The recommendation that printed instructions be placed on envelopes, is a good suggestion and no doubt would save a great deal of carbon paper. I'd like to suggest reversing the end of the carbon paper, especially where forms are used.

W. S. Morehead (I. C.): Besides stationery, the largest individual item is the printing of tariffs. I would like to ask if the committee gave any thought whatever to a reduction, either in size or in a number of forms dis-

tributed to that particular feature. We find that is the largest item we have.

Mr. Anderson: The size is determined by the I. C. C., so it would be impossible to change it. This committee has not gone into the tariffs. I understood that several years ago the stationery committee had covered tariffs at that time.

Mr. Morehead: I would like to recommend for the next committee that this feature be given special consideration for the thought of doing something along that line.

The report was then accepted without further discussion.

Report on Fire Prevention in Storehouses

Losses from destruction of supply buildings and contents show decline——Make rules for further reductions

E. W. Peterson
Chairman

The previous committee report gave a complete report of the Railway Fire Protection Association Committee on protecting company material in storehouses, material yards, etc. At the annual meeting of that association, during October, 1929, there were several changes made, as follows:

Creosoted lumber should be piled solid to prevent rapid spread of fire through it.

Nitric acid or mixture of nitric acid with sulphuric acid will cause fire when in contact with combustible materials. Sulphuric acid and muriatic acid are not likely to cause fire by contact with combustible materials, but may cause fire on contact with certain chemicals. Nitric acid and nitric acid mixtures should not be kept near combustible materials. Acids generally should not be stored with or near other chemicals. If there is a leakage of nitric acid or nitric acid mixtures, poisonous and irritating fumes may be given off, especially if the acid comes in contact with combustible material and causes smoke, fire or visible fumes. Breathing of these fumes should be avoided as far as possible. The main carboy storage should be kept outside or in a separate well ventilated building or shed. The different acids should be placed separately to prevent mixing in case of leakage.

Railroad Fires

Year	No. Fires	Value
1923	8,395	$ 9,001,122.66
1924	8,609	10,049,936.45
1925	7,866	7,397,433.98
1926	8,388	7,268,435.23
1927	4,283	4,328,631.00
1928	6,088	4,508,112.00
Total,	43,629	$42,553,671.32

1923	112	Storehouse buildings and contents	$ 867,247.66
1924	80	Storehouse buildings and contents	187,001.96
1925	71	Storehouse buildings and contents	327,860.31
1926	49	Storehouse buildings and contents	21,466.34
1927	8	Storehouse buildings and contents	269,160.00
1928	60	Storehouse buildings and contents	25,223.00
Total,	380		$1,697,959.27

Causes of Storehouse Fires

	No.	Loss
Improper construction, installation or maintenance of stove or stove pipes	2	$ 13.00
Back-fire and hot coals	1	250.00
Oil lighting	1	1,083.00
Electric lighting	1	16.00
Sparks or hot coals from locomotives	5	217.00
Electric power and motors	3	7,433.00
Open flame torch	5	987.00
Burning right of way	1	388.00
Fuel oils	2	1,721.00
Exposure	1	36.00
Lightning	1	1.00
Smoking and matches	5	359.00
Trespassers	5	3,834.00
Incendiary	3	646.00
Spontaneous ignition	5	452.00
Unknown	6	6,312.00
Not separately classified	13	1,475.00
Total	60	$25,223.00

Electric Wiring

On account of the tendency during the present time to modernize, it is recommended when high wattage lamps or modern electrical devices are installed, that careful attention be given to provide sufficient wire or transmission capacity to permit the use of these modern devices without unsafe overloading.

A competent electrician can determine by examination the capacity of the wire, load carried, current demand, general conditions of safety, and the proper size fuse required to protect the installation, and it is recommended that all electric wiring and appurtenances be inspected by competent men and that the installation conform to requirements of the National Electrical Code, and that tests be conducted at intervals of not less than twice annually, and more frequently if considered advisable.

The committee suggests that particular attention be given to the issuing of correct fuses from stock. In all cases requisitions on the store should show the correct capacity of fuse required and bear the signature of the electrical foreman. The right fuse in the proper place is a protective device. Substitutes, bridging, or reinforcing should not be allowed.

Good housekeeping is one of the best fire prevention methods. Avoid rubbish accumulation in lockers, cupboards and out-of-the-way places. Oily rags must be cared for by submerging in water or burned.

Proper care should be used in handling paint, varnish or other inflammable material that has been damaged in transit. The practice of using cotton waste or similar material to fill a hole in the container should be discouraged.

The National Board of Fire Underwriters have specifications for the construction of ¾ in., 1 in. and 1¼ in. cotton-covered, rubber-metal hose for conducting gasoline in garages and other places where short lengths not exceeding 15 ft. of flexible hose are required. Use of this conductor eliminates one great danger.

It is recommended that a standard tag be used on all hand chemical extinguishers to read as follows:

THIS FIRE EXTINGUISHER WAS TESTED, CLEANED AND RECHARGED ON.....(Date) BY.....
IT MUST BE TESTED, CLEANED AND RECHARGED AGAIN WITHIN TWELVE MONTHS.

A Gas House on the Santa Fe Built for Safety

The report is signed by E. W. Peterson (Chairman), general storekeeper, Bangor & Aroostook; A. J. Cossette, storekeeper, Chicago & North Western; S. R. Proffitt, assistant to purchasing agent, Western Pacific; E. L. Walker, purchasing agent, Akron, Canton & Youngstown; L. G. Pearson, district storekeeper, Southern Pacific.

Chairman E. W. Peterson (Bangor and Aroostook): The committee desires to call attention to the comparatively small loss by fires during the past year. We also desire to call your attention to the large fluctuations in previous years. The amount is very large when it is totaled up on the basis of five or six years, whereas during the past year and in 1928 the amount was something like $25,000.

The report was accepted without discussion.

Report on Material Handling and Distribution

A unified control of all motorized equipment around terminals urged——Stress good roads

J. V. Miller
Chairman

At present most of the motorized equipment used on railroads is assigned to and operated by various departments. This is very expensive, as it does not allow the maximum return on the investment for the following reasons:

1. Makes necessary the purchase of more equipment than needed.
2. Causes duplicate service to be rendered.
3. Divides responsibilities for work to be done.
4. Causes lack of uniformity in the maintenance of the equipment, with resultant delays.
5. Eliminates the possibility of laying out a definite system of delivery.

It is recommended that the control of motorized equipment be unified by placing it under the jurisdiction of one department, preferably the Store Department, this department to have a general supervisor and the necessary help to handle it for all departments.

Previous committees have properly dwelt upon the desirability of keeping such equipment busy to the maximum extent. This committee recognizes this need to accomplish maximum savings, but also recognizes that the hours of service may be of secondary importance when it can be definitely established that even under restricted hours of service the savings are more than sufficient to justify the investment.

Distributing Cross Ties

On one railroad the tie distribution is handled by the Store Department, and has resulted in substantial reduction in cost of handling.

The installation of ties is heavy approximately ten months of the year and the ties are distributed direct to the work with a minimum amount of handling. During the months of November and December creosoted ties are stored in the storage yards, so that in January they are ready to distribute from this reserve, as the demands are generally heavy the first of the year. All the ties are not distributed by tie trains, but the plan is gradually working to this on all divisions where such handling is possible.

Upon completion of the renewal check, made by maintenance of way forces, requisitions are placed covering the heavy spring installation requirements, and the divisions are supplied with a 45 to 60-day working stock, which is based upon the maintenance of way monthly installation program. Where the tie requirements on any one district are in sufficient number to warrant distribution by a special tie train, arrangements are made to load from 5,000 to 6,000 ties at the yard and ship them to the point where distribution is to start.

Tie trains, as a rule, are accompanied by the roadmaster, division storekeeper, and a gang of about fifteen men. Four to five men are placed in a car, and as the train moves along slowly the ties are unloaded from two or three cars at a time. The ties are dropped along the right of way at points where they are to be placed in the track as designated by roadmaster. No other material is handled by these trains.

In certain localities, where the local schedule permits, ties are also distributed by local freight trains. A gang of four men follow the train later to properly line up the ties unloaded along the right way, which removes the hazard of ties lying too close to the track.

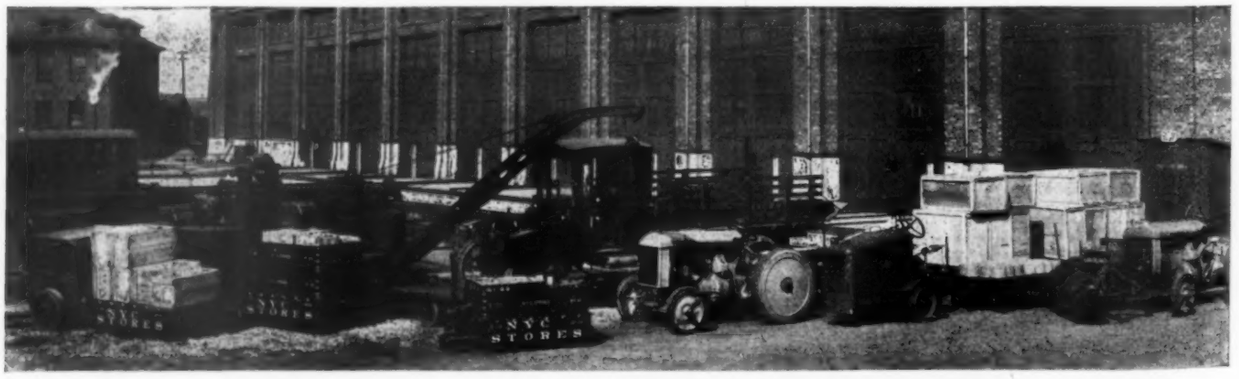
A careful check of distribution cost by local or special tie train will show a substantial reduction over the practice of unloading ties at section headquarters or at various points on the line, if consideration is given to the setting out of cars for unloading, unloading and piling, picking up the car after it is emptied, tying up equipment, and distribution by section forces on line by push or gasoline motor cars.

No attempt is made to distribute by local or special tie trains ties required in congested territories in and around large cities, and those required for industry spurs.

Garages

Though constantly increasing our automotive equipment due consideration has not been given to its proper housing. In the majority of cases machines are stored in shop buildings, store buildings, or any vacant building available. This should not be tolerated any longer than is absolutely necessary. The maximum efficiency of the machines can only be secured by providing proper housing for it.

At larger points a separate garage building should be provided, large enough for present and future needs. It should be strictly fireproof, equipped with proper ventilation and gasoline and oil storage, as well as proper equipment for charging electric machines. It should also be equipped with the necessary tools for the maintenance of machines. At smaller points garages should also be provided, and all machines should be kept together.



Motorized Handling Equipment on the New York Central at Collinwood, Ohio

Motorized Material Distribution on the Union Pacific at Los Angeles, Cal.

The facilities should be requested at the same time machines are requested, and their costs should be included, so that proper savings can be computed.

Automotive Repair Men

Wherever there are sufficient machines in service, it is recommended that automotive repair men be employed. This will prevent unnecessary delay to equipment undergoing repairs and assure daily attention. An automotive repair man is recommended, as this work is highly specialized.

Under present arrangements, considerable controversy has arisen with the shop crafts, and different men are assigned to make repairs, without any of them becoming thoroughly familiar with the equipment. It is felt that in recommending an automotive repair man arrangements can be made with the shop crafts to permit this classification.

Standardized Skids

It is recommended that the Division adopt a standardized shipping skid. The Department of Commerce is advocating the adoption of two sizes:

33 in. by 54 in. by 12 in.
42 in. by 66 in. by 12 in.

The prevailing sizes used on railroads at this time for shipping are:

32 in. by 54 in. by 12 in.
33 in. by 54 in. by 12 in.

A standardized skid will permit manufacturers to keep this item in stock at all times, and will result in a more attractive price. The committee recommends a minimum width of 32 in. and a maximum width of 33 in., as in pressing, the skids do not always hold to an exact size, and either one of these sizes would not interfere in the proper handling of skids.

A great many special skids are needed for handling various commodities, such as air brake hose, brake beams, tires, oxygen, etc., and it is recommended that Division VI adopt standards for such skids, so that all railroads will have similar equipment.

It is also recommended that as individual railroads develop new skids or other material handling equipment for specific purposes, they transmit to the Secretary detailed prints and explanations so that any member desiring to develop specific equipment may ascertain whether or not equipment suitable for the purpose has already been developed.

Handling Material on the C. M. St. P. & P. at Milwaukee, Wis.

Roadways

The committee recognizes the importance of good roads for the efficient and economical operation of material handling equipment, and quote part of the 1925 report of Committee on Buildings on this subject:

"The study given this subject by a large railroad preliminary to building its first 2½ miles of permanent road included the use of an electric truck, with a weight of 2,220 lbs., and a capacity of 4,000 lbs. and equipped with 15½-in. rubber-tired wheels with 3-in. tread trailers with 8½-in. front wheels with 2½-in. tread, and 18-in. rear wheels with 3½-in. tread.

"It was found that with a truck loaded with 2,000 lbs. and each trailer having a load of 2,000 lbs., the truck could pull four loaded trailers on concrete with less power at the motor and less draw bar pull than it took to move the truck and one trailer on a cinder roadway. On wood, the draw bar pull was 165 lbs., on metal 95 lbs., against 90 lbs. per trailer on concrete roadways on starting the load. It takes a steady pull of 225 to 250 lbs. to one loaded trailer on cinder road, 57 lbs. on brick pavement, 47 lbs. on concrete rough surfaced, and 30 to 35 lbs. on smooth, trowel-finished concrete. The results showed so favorable for concrete that that material was selected for the construction."

In the Santa Fe Store at Topeka, Kan.

The report is signed by J. V. Miller (chairman), assistant general storekeeper, Chicago, Milwaukee, St. Paul & Pacific; R. D. Crawford, general storekeeper, Gulf Coast Lines; J. C. Glenn, storekeeper, Central of New Jersey; P. W. Grayson, division storekeeper, Texas & Pacific; E. H. Hughes, general storekeeper, Kansas City Southern; L. H. Johnson, local storekeeper, Union Pacific; E. H. Landers, general storekeeper, Cleveland, Cincinnati, Chicago & St. Louis Ry.; G. W. Leary, supervisor stores delivery, Chesapeake & Ohio; J. C. McCaughan, general storekeeper, Hocking Valley; A. Schipper, stores inspector, Southern Pacific; O. A. Schultz, inspector of stores, Chicago, Burlington & Quincy; G. D. Tombs, division storekeeper, Illinois Central; J. W. Watkins, division storekeeper, Lehigh Valley; C. B. Hall (chairman ex-officio), stores manager, Pennsylvania.

Discussion

Chairman J. V. Miller, (C. M. St. P. & P.): The committee was handicapped in making the report this year due to the fact that we had planned to have approximately 2,000 ft. of motion pictures. They couldn't be shown here. That was cancelled. However, we have gone ahead with some of the work on the pictures, and they will be given to next year's committee.

A. W. Munster (B. & M.): Did the committee consider the use of slings in distributing ties where a large number of ties are being distributed? We save a con-

siderable amount of money by taking the ties from the tram cars in the treating plant and leaving the sling on them. When they get to the job, they can unload them in sling loads. It saves labor and is also a safety feature.

Mr. J. Miller: The man that handled this question was from the Southern Pacific. Unfortunately, he is not here. As a whole we did not consider the sling method or any other particular method.

The report was accepted without further discussion.

Report of Standardization and Simplification

Railroads report on use of recommended lists and additional standards agreed upon

L. F. Duvall
Chairman

The committee has obtained information from the railroads as to their adherence to previous recommendations, in the interest of simplifying stores stocks. The replies to a questionnaire indicate that 27 railroads have a standard list of material. In reply to the question, "How many items of material were listed in your master stock book January 1, 1925 and how many January 1, 1930?" information was received as tabulated.

Where 1930 shows an increase over 1925, explanations were given showing that the increases were due to mergers, new equipment, new devices and to adding items left off the 1925 list.

Road	Items Jan. 1, 1925	Items Jan. 1, 1930
A	12539	13002
B	32000	41000
C	74515	63069
D	30579	36213
E	46000	44800
F	32000	24000
G	23350	25412
H	38198	36147
I	46000	50000
J	26987	28204
K	39000	43000
L	52025	45462
M	54154	61729
N	38168	33312
O	29458	27883
P	66715	49747
Q	68000	75000
R	27550	28560
S	40000	43800
T	21860	25271
U	42000	34000
V	30935	21179
W	15660	38161
X	17821	20446
Y	45000	45000
Z	33000	27000
&c	41919	45251
Total	1025433	1026648

Adherence to A. R. A. Standards

A third question was asked as follows:

Do your standard sizes of boiler lagging, flat and curved, carriage bolts, machine bolts, locomotive boiler rivets and structural rivets comply with the sizes recommended at the June, 1926, meeting of Division VI, shown on page 221 of the proceedings? If not, give actual sizes of each of these items listed in your master stock book.

Replies were received from twenty-two railroads giving information tabulated below:

Per Cent Adherence

Road	Lagging	Carriage Bolts	Machine Bolts	Structural Rivets	Boiler Rivets
A	50	90	88	88	...
B	100	100	100	100	...
C	...	84	...	83	...
D	84	84	76	50	31
E	83	100	100	100	100
F	41	98	97	100	50
G	...	95	98	60	84
H	83	95	80	52	68
I	100	98	79	96	84
J	78	99	80	78	84
K	...	76	56	74	67
L	70	90	92	95	93
M	54	73	68	40	58
N	73	80	74	43	76
O	...	74	70	65	57
P	100	100	100	100	100
Q	...	64	73	30	30
R	75	92	87	100	100
S	70	100	100	100	100
T	70	98	98	100	100
U	63	99	86	98	63
V	70	82	68	...	60

New Standards

A questionnaire was sent to 42 Class I roads requesting sizes of the following groups listed in the master stock book. We received information from 30. Each group tabulated represents the sizes five or more roads used. Your committee recommends the adoption of each group as listed:

High Speed Steel, Flat

½ x 1	⅝ x 1¼	¾ x 1½	⅞ x 1¾	1¼ x 2½
½ x 1¼	⅝ x 1½	¾ x 1¾	1 x 1½	1½ x 2
½ x 1½	⅝ x 2	¾ x 2	1 x 2	1½ x 2½
½ x 2	¾ x 1¼	⅞ x 1½	1¼ x 1½	1½ x 3
⅝ x 1				

High Speed Steel, Round

½	⅝	1	1¼	1½	1¾	2	2½	3	3½	4½
⅝	⅞	1⅛	1⅜	1⅝	1⅞	2¼	2¾	3¼	4	5

High Speed Steel, Square

¼	7/16	⅝	⅞	1¼		1¾
5/16	½	¾	1	1½		2
⅜						

Carbon Steel, Octagon

⅜	½	⅝	¾	⅞	1	1⅛	1¼	1½

In an Atlantic Coast Line Store at Rocky Mount, N. C.

Carbon Tool Steel, Round

1/4	7/16	5/8	1	1 3/8	1 7/8	2	2 3/8	2 3/4	3 1/2	4 1/2
5/16	1/2	3/4	1 1/8	1 1/2	1 3/4	2 1/8	2 1/2	3	3 3/4	5
3/8	9/16	7/8	1 1/4	1 5/16	1 7/8	2 1/4	2 5/8	3 1/4	4	6

Carbon Tool Steel, Square

1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2 1/4	3
3/8	5/8	7/8	1 1/8	1 3/8	1 5/8	2	2 1/2	4

Wood Screws, Flat Head, Brass

No.	Sizes										
	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
3	x	x										
4		x	x	x		x						
5		x	x	x		x						
6		x	x	x	x	x	x		x			
18		x	x	x	x	x	x	x	x	x		
10				x	x	x	x	x	x	x	x	x
12				x		x	x	x	x	x	x	x
14						x	x	x	x	x	x	x
6							x			x		x

Wood Screws, Oval Head, Brass

No.	Sizes											
	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
4		x	x	x									
5		x	x										
6	x	x	x	x	x	x	x	x					
8		x	x	x	x	x	x	x	x	x			
9				x			x						
10		x		x	x	x	x	x	x	x	x	x	
12				x		x	x	x	x	x		x	x
14								x	x	x		x	x

Wood Screws, Round Head, Brass

No.	Sizes										
	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
4	x	x	x								
5	x										
6	x	x	x		x	x	x				
8	x	x	x	x	x	x	x		x		
10			x		x	x	x		x	x	x
12					x	x	x		x		x
14						x		x	x		x

Wood Screws, Flat Head, Iron

No.	Sizes														
	3/16	1/4	5/16	3/8	7/16	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/2	4	4 1/2	5
3	x																	
4	x	x	x	x	x	x												
5	x	x	x	x		x												
6	x	x	x	x	x	x	x	x										
7			x	x		x												
8	x	x	x	x	x	x	x	x	x	x	x		x					
9		x	x	x		x												
10		x	x	x	x	x	x	x	x	x	x	x	x	x	x			
12				x	x	x	x	x	x	x	x	x	x	x	x			
14				x	x	x	x	x	x	x	x	x	x	x	x			
16				x		x	x	x	x	x	x	x	x	x	x			
18						x	x	x	x	x	x	x	x	x	x			x
20									x		x		x	x	x	x		

Wood Screws, Round Head, Iron

No.	Sizes								
	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2
6	x	x	x					
8		x	x	x	x		x	x
10		x	x	x	x	x	x	x
12			x	x			x	x
14				x	x		x	
16				x		x	x	

Machine Screws, Flat Head, Brass

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	3/8	32	10	3/4	24
8	3/8	32	10	3/4	32
10	3/8	24	12	3/4	24
10	3/8	32	14	3/4	20
4	1/2	36	6	1	32
6	1/2	32	8	1	32
8	1/2	32	10	1	24
10	1/2	24	10	1	32
10	1/2	32	12	1	24
12	1/2	24	12	1	28
6	5/8	32	14	1	20
8	5/8	32	8	1 1/4	32
10	5/8	32	10	1 1/4	24
6	3/4	32	10	1 1/2	32
8	3/4	32	10	1 1/2	32

Machine Screws, Oval Head, Brass

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	3/8	32	6	3/4	32
8	3/8	32	8	3/4	32
6	1/2	32	10	3/4	32
8	1/2	32	6	1	32
8	1/2	32	8	1	32
10	1/2	32	10	1	24
8	5/8	32	10	1	32

Machine Screws, Round Head, Brass

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	3/8	32	10	3/4	32
8	3/8	32	12	3/4	24
6	1/2	32	14	3/4	20
8	1/2	32	6	1	32
10	1/2	24	8	1	32
10	1/2	32	10	1	24
12	1/2	24	10	1	32
6	5/8	32	12	1	24
8	5/8	32	8	1 1/4	32
10	5/8	24	10	1 1/4	24
6	3/4	32	12	1 1/4	24
8	3/4	32	8	1 1/2	32
10	3/4	24	10	1 1/2	24

Machine Screws, Flat Head, Iron

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	3/8	32	10	1/2	32
8	3/8	32	12	1/2	24
6	1/2	32	6	3/4	32
6	3/4	32	8	3/4	32
8	3/8	32	10	3/4	24
10	3/8	24	10	3/4	32
6	1/2	32	8	1	32
8	1/2	32	10	1	24
10	1/2	24	10	1 1/4	24

Machine Screws, Fillister Head, Iron

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	1/2	32	12	3/4	24
12	1/2	24			

Machine Screws, Round Head, Iron

No.	Size	Threads per Inch	No.	Size	Threads per Inch
6	3/8	32	6	3/4	32
8	3/8	32	8	3/4	32
6	1/2	32	10	3/4	24
8	1/2	32	10	3/4	32
10	1/2	24	12	3/4	24
10	1/2	32	6	1	32
12	1/2	24	8	1	32
8	5/8	32	10	1	24
10	5/8	24	12	1	24
10	5/8	32	10	1 1/4	24
12	5/8	24			

The committee included in the above groups of machine and wood screws only American standard sizes.

Rope—Manila

Diameter		
3/8	1	2
1/2	1 1/4	2 1/4
5/8	1 1/2	2 1/2
3/4	1 3/4	3
7/8	...	...

Double Strength Window Glass

8 x 10	12 x 12	14 x 14	16 x 18	18 x 24	20 x 30	24 x 34	28 x 36
9 x 12	12 x 14	14 x 16	16 x 20	18 x 26	20 x 34	24 x 36	28 x 38
9 x 13	12 x 16	14 x 18	16 x 22	18 x 28	20 x 36	24 x 40	28 x 42
9 x 14	12 x 18	14 x 20	16 x 24	18 x 30	22 x 24	26 x 26	30 x 30
10 x 12	12 x 20	14 x 22	16 x 26	18 x 32	22 x 28	26 x 28	30 x 32
10 x 14	12 x 22	14 x 24	16 x 28	18 x 34	22 x 30	26 x 30	30 x 36
10 x 16	12 x 24	14 x 26	16 x 30	18 x 36	22 x 32	26 x 32	32 x 36
10 x 18	12 x 26	14 x 30	16 x 32	20 x 20	24 x 24	26 x 36	36 x 36
10 x 20	12 x 28	14 x 32	16 x 36	20 x 22	24 x 26	28 x 28	.....
10 x 24	12 x 30	14 x 38	18 x 18	20 x 24	24 x 28	28 x 30	.....
10 x 30	12 x 32	15 x 30	18 x 20	20 x 26	24 x 30	28 x 32	.....
10 x 36	12 x 36	16 x 16	18 x 22	20 x 28	24 x 32	28 x 34	.....

Some roads use grade B instead of grade A. A number of roads listed odd sizes. All odd sized glass takes the price of the next larger standard size plus 10 per cent.

Pipe Fittings and Valves

The committee finds some roads experiencing trouble in making purchases of pipe fittings and valves on account of the lack of uniformity in face-to-face dimensions. Division V, A. R. A., has a committee working on pipe unions and fittings, but nothing has been done so far on screwed globe and angle valves which represent more capital per unit than other fittings of the same size. The Division of Simplified Practice, U. S. Department of Commerce, offered their services to establish standards for screwed globe and angle valves. It is recommended that Division VI favor standard end to end dimensions and standard hand wheel holes on all sizes of globe and angle valves.

Railway Electrification Materials

Electric motive power is now in use to some extent on several large railways, and undoubtedly its use will be greatly extended in the coming years. Few of the materials used in power line and catenary construction have been standardized. The advantages of universal standards would be as follows:

1. Greater competition in purchasing.
2. Lower prices.
3. Quicker delivery.

4. Less stock necessary for emergency protection and for maintenance.

5. Availability of emergency materials on adjacent railroads.

The committee recommends that the attention of the Electrical Section be drawn to the advantage of standardization of this material from a purchase and stores standpoint and that it be requested to undertake standardization insofar as it may be practical.

Standard Packages

At the solicitation of the American Electric Railway Association, a representative from this Division is co-operating with them on the standardization of standard packages.

Material Reaching Obsolescence

The committee offers below some concrete examples of how obsolete and slow-moving material have been disposed of:

Old pintsch gas tanks from passenger cars converted to oil storage tanks or converted to culvert pipe.

Motors rebuilt to change voltage.

Superheater headers converted for use on other locomotives by welding holes and cutting corners.

Obsolete 3/16 stove bolts used in place of carriage bolts.

Surplus lag screws converted to bolts by cutting and threading.

Driver spring hangers shortened to active design.

Locomotive cylinder heads modified to suit new style packing.

Locomotive cylinder heads changed by machining rod openings.

Piston valve bushings changed by cutting off one end and remachining.

The report is signed by L. F. Duval (chairman), assistant general storekeeper, Atlantic Coast Line; T. E. Britt, storekeeper, Baltimore & Ohio; O. T. Burleigh, traveling storekeeper, Buffalo, Rochester & Pittsburgh; E. J. Burns, traveling storekeeper, Atchison, Topeka & Santa Fe; W. A. Clem, assistant purchasing agent, Reading; H. W. Concannon, district storekeeper, Southern Pacific; A. G. Follette, assistant chief material supervisor, Pennsylvania; J. S. Gabriel, division storekeeper, Denver & Rio Grande Western; W. L. Hunker, district storekeeper, Chicago, Rock Island & Pacific; P. C. Mayer, special buyer, purchasing department, Illinois Central; R. F. Welch, special assistant, store department, Texas & Pacific; W. W. Williams, chief of requisition bureau, New York Central; G. E. Scott (chairman ex-officio), purchasing agent, Missouri-Kansas-Texas.

Discussion

Chairman L. F. Duvall (A. C. L.): We were rather amazed at the reports we received on the adherence to these standards recommended in 1926. When we received the reports from the various roads as to what they were using, in the new classes of items considered, we found it difficult to set up standards. So, we finally decided we would take five out of the thirty. We sent out reports to 42 roads, and received replies from 30.

We wish to direct your attention particularly to signal flags. It seems that a large majority of the railroads are using the 18-in. by 18-in. signal flag.

We also want to elaborate a little on pipe fittings and valves,—face to face dimensions. Some roads are experiencing considerable trouble in changing from one standard to the other on account of face to face dimensions. In case a standard is changed to another dimension, it requires a change in the pipe on the cars or wherever the valves are used.

[*After outlining the report further, the motion was made and carried to accept it without further discussion.*]

Handling Signal Material on the Boston & Maine

Methods by which one road effectively handled $695,000 of supplies last year described

By A. P. Pollard
Traveling storekeeper, Boston & Maine, Boston, Mass.

A. P. Pollard

The increased use of signals involves the storage and distribution of a completely new and varied line of apparatus heretofore unfamiliar to the railroad storekeeper. In order to look after the requirements of the signal department properly, the stores man must be thoroughly familiar with the apparatus.

On the Boston & Maine, all signal material is carried at the general storehouse, and the same control and consideration is given to signal material as is given to all other material carried in the stores department. One traveling storekeeper with signal department experience, devotes his time to signal department matters, visiting large construction jobs and making frequent personal contacts with the signal engineer, supervisors and maintainers. At the storehouse, the stockman in direct charge of this material also had experience as a signalman. This man also makes checks and inspections of the major construction projects and confers with signal maintainers, thereby keeping in touch with new practices and standards, enabling him to get first-hand information, which greatly assists in the proper filling of orders and results in a better understanding between the field forces and stores department.

Preparing the Orders

Signal maintainers order their own material for ordinary repairs. These orders are then approved by the division signal supervisor for quantity, etc., and by the signal engineer for standards. Shipments to various divisions are made monthly according to a schedule, the orders for each division arriving at the storehouse about ten days before the shipping date.

Elements necessary for the renewal of signal batteries are ordered monthly upon the manufacturer, who ships direct from the factory in car load lots to a designated freight transfer point on our lines where the shipment is broken up and forwarded l. c. l. to various destinations according to the addresses on containers. None of these pass through the storehouse, but a small supply is carried for emergency purposes. Battery manufacturers make delivery of renewals on our lines within a week after receiving the order.

Requisitions covering material for new work are prepared by the signal inspector in the office of the signal engineer who has charge of development and construction. After being approved by the signal engineer, the requisitions are sent to the general storehouse, where the material is assembled and held for shipping instructions. Any special items not in stock are immediately ordered through the purchasing department to be shipped direct to the job, the signal department being kept advised as to delivery promises from the manufacturer.

Two helpers are kept busy filling orders for maintenance and operation, shipping between $20,000 and $35,000 worth of material monthly. Two other helpers are engaged in assembling and shipping of material for construction jobs.

Distributing Signal Material

The Boston & Maine does not operate a supply train. The material is, therefore, shipped by freight to the most convenient transfer point and there reshipped l. c. l. to destination, except where the quantity warrants straight car shipment. Part of the present program consists of installing a number of highway crossing signals, which are being shipped at the rate of about three a week. A shipment of this kind is forwarded in a straight car direct to the job, and consists of all material necessary for the project, from the concrete foundation material to the paint used to stripe the poles.

Items such as cement, paint, standard sizes of bolts, lumber, etc., are drawn on the respective sections in the storehouse, and checked into the car by helper in charge of loading. This eliminates shortages which might otherwise occur. The heavier items of signal material such as signal poles, concrete battery boxes, cast iron battery chutes, etc., are stored out of doors near the loading platform where they can be picked up and loaded into a car with small cranes. The car for loading is set at the

loading platform opposite the sand and broken stone piles so that no additional shifting of the car is necessary, both doors of the car being used at the same time. Mechanical signal material of a heavy nature is stored under cover, so arranged as to be handled by truck service. The lighter parts and most of the electrical material is kept in racks and bins inside the storehouse, so arranged that the items most commonly used are nearest the point of shipment.

The various signal construction crews work on a schedule arranged so as to reduce to a minimum the delay caused by lack of material. They also arrange the program so that crews will not have to make long jumps from one job to another. When more than one installation is scheduled in the same general locality, it is sometimes necessary to rush material for a recently developed job so that a crew of a much older project can install both at the same time. In this connection, it is sometimes necessary to hold the shipment for the reason that a signal crew is not available for that job, the aim being to have material arrive on the ground with the crew. This reduces the loss of material due to theft, etc., which happens in our thickly settled areas.

Keep All Material in Stock Balance

All signal material on the line is carried in the stores department stock balance until actually used or installed by the using department. For convenience, we have set up a special class designated as Class 53, into which the value of maintenance material is transferred when shipped out on the line from the storehouse. This enables us at all times to divide the signal stock balance as between the value of material at the storehouse and on A. F. E. projects, and material on the line for maintenance purposes. It also assists at inventory time in locating causes for inventory adjustments.

On a few A. F. E. projects where a large value is involved, the value of material furnished is transferred into special Class 54, in order that the charges can be checked more closely. On a recent check of a job involving the expenditure of approximately $28,000, the book balance was within $1,000 of the total amount of material furnished when the project was completed. The credit for this good showing did not, however, all belong to the signal department. We would have had several thousand dollars left in the book balance had not the traveling stores forces, with the figures before them, been able to locate considerable material loaned to maintenance forces and never returned, having been taken for use on other projects and never reported, etc.

On the Boston & Maine, the issues of signal material in 1921, excluding those covered by contract jobs installed by manufacturers, amounted to $332,000, and in 1929, $695,000, an increase in issues of approximately 110 per cent in 8 years.

Because of the fact that the manufacturing of signal apparatus, including centralized dispatcher's control systems, car retarders, automatic train control, highway crossing signals, etc., is a highly specialized art, and that a substantial part of the equipment is covered by patents under the control of two manufacturers, there is little competition to force the speeding up of deliveries and it takes from 60 to 120 days to obtain material. This situation is aggravated by the fact that the building of signal equipment requires specially trained men, and the responsibility is placed on the manufacturer by the railroads to produce dependable apparatus.

Avoid Substitutions

In maintaining this highly specialized equipment, the railroad organizations also have a problem on their hands. Likewise, the utmost caution must be used by the stores department in shipping the material. No questionable items should be allowed to get in stock, which is the safest way to assure their not getting into service. Substitutions must be made cautiously. Some of the simplest substitutions which would not interfere with production in other departments would cause unnecessary delay and expense in the signal department.

Taking Inventories

The inventory of all material on the line is taken by signal forces on the same date the storehouse inventory is taken. Inventory sheets are forwarded by signal maintainers to their respective supervisors, who hold them for the arrival of stores representative, who makes such spot checks as he thinks necessary and straightens out all questionable items, taking the inventory detail with him when he leaves. The pricing and computing of inventory, together with all stores accounting, is handled by the accounting department, which maintains an office at the general storehouse. All charges, credits, invoices, etc., pertaining to signals, pass through the hands of a specially designated clerk, practically assuring correct classification and pricing.

Repair with Caution

Shops in which signal material is reclaimed or repaired, if not under the jurisdiction of the signal department, should be frequently visited by the signal inspector to insure proper workmanship. The stores department on the Boston & Maine operates the relay repair department, where approximately 1,000 signal relays and 300 electric motors are repaired annually. It also repairs signal controller boxes, electric bells and other miscellaneous signal equipment. This material is reclaimed and repaired only as fast as consumption warrants and no equipment is overhauled and reconditioned unless we have the assurance of the using department that they will require same.

The problem of reclamation and obsolescence cannot be given too much attention. Much signal material is removed from service simply because it has become necessary to install in that territory a more efficient system to permit quicker service. The equipment removed, therefore, is not worn out and might not at that time be considered obsolete, but, because the more modern equipment is such a vast improvement over the old, there is little likelihood of its ever being used again. For this reason, the reclamation of signal apparatus should be watched very closely to see that no material, however serviceable, should be reconditioned and allowed to get into stock unless there is positive assurance that it will again be used.

Signal material should come under the complete control of the storekeeper.

Discussion

O. Nelson (U. P.): Does the signal repair shop which you are conducting under the stores department supervision serve the entire railroad and is it centrally located?

Mr. Pollard: The repair shop is located at the general storehouse and repairs are made there of signal apparatus for the entire railroad.

Mr. Nelson: Do you people experience any difficulty in making satisfactory repairs? In other words, are the men in the signal department inclined to pick flaws with the work done in your repair shop because it is under the stores department supervision?

Mr. Pollard: We were bothered a little in that respect some time ago. At the present time we have an able man at the head of that and we have furnished him with some good machinery and meters for testing. Everything meets A. R. A. specifications.

A Battery of Gas Tractors on the Union Pacific Installed for Handling Stores Material

Report on Loading and Handling Cars

Analysis made of company material shipments to develop ways of cutting non revenue operations

Grover Wonnell
Chairman

The primary factor of capacity loading, is the accurate knowledge of what materials are to be shipped, to whom, and when. This knowledge can, and should be obtained by having proper supervision at the loading points.

All shipments should be controlled with a consolidated periodical shipping schedule, which should be based on existing material conditions, but subject to modifications. All cars listed thereon must be forwarded on the sailing date shown, unless the consignee has been previously notified. A copy of this schedule should be at all ordering, shipping, and receiving points. This advance information at the receiving store not only enables the storekeeper to request items requiring preferred attention, but may eliminate the possibility of special shipments. The shipping store is also able to assemble from the various departments all materials available for each point in sufficient time to permit proper loading of car. Several of the roads have incorporated in their shipping schedules a designated train in which each car will move. This is a great advantage to the receiving store, in that the yard arrival time of train is known, thus simplifying or eliminating the need of tracing.

Proper Selection of Cars

The class of equipment used for company material should be confined to that least in demand for commercial shipments. Some roads have adopted the practice of classifying all cars, and carding them for the service for which they are suitable. This is an aid in confining company material to proper equipment.

As far as consistent, foreign cars when received from outside concerns, should not be reloaded and if the shipment originated on the receiving lines, the car should be reported usually through the purchasing department.

A. R. A. Loading Rules

A copy of the A. R. A. Loading Rules should be in the hands of all loading foremen or supervisors, who should be thoroughly familiar with the requirements on all commodities being handled. All violations of these rules should be reported by receiving points.

Containers for Small Commodities

The use of containers or skids for shipment of certain commodities, conserves floor space in cars, increases the load, saves in packing, expedites handling and prevents damage in breakage.

Conditions at Unloading Points

At the major loading points, adequate mechanical facilities are usually available for handling the items to be shipped, whereas, the unloading or receiving point is not warranted in maintaining such handling equipment. Therefore, the facilities for unloading at destination, should be given careful thought by the originating station. Generally, locomotive and car materials are at different locations, and it usually requires additional switching service to move the car from one point to another. Shipping stores should bear this in mind when it is necessary to combine tonnage for capacity loads and keep the material separated as far as possible.

Return of Material

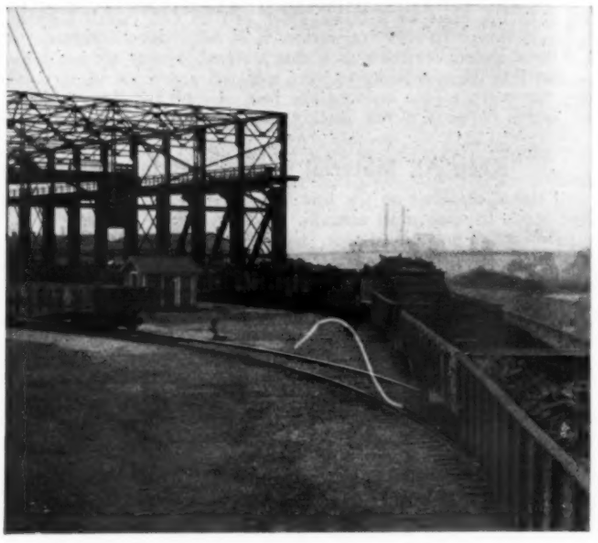
Repairable material should be accumulatetd by commodities and shipped to the repair point or main store with a certain degree of regularity. The frequency of such shipments should be determined by stock conditions of each item throughout the area in which the particular commodity is accumulated. Conservation of equipment can be effected by including surplus material and certain classes of scrap in such shipments.

Co-operation With Transportation Department

The stores department should at all times co-operate very closely with the yard master, or operating representative having jurisdiction over the classification and placing of company material cars on tracks allocated to that purpose.

Accurate Car Reports

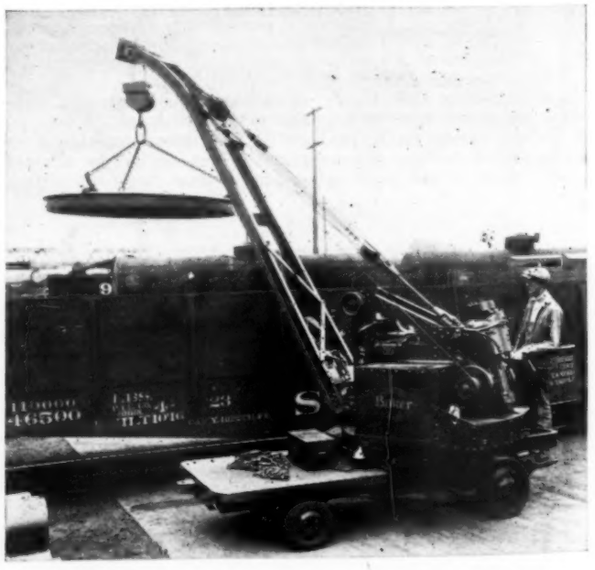
The efficient handling of cars cannot be accomplished without an accurate car report. This report must be prepared daily showing all cars placed on company material tracks in the classification yard, and those remaining in the shop yard from the previous day. The report should show the car initial and number, commodity, time arrived in classification yards, time arrived in shop yard, time requested to be spotted, time spotted, time and date emptied. The storekeeper or foreman, should personally handle this report and be accountable for its accuracy.



Loading Out Scrap on the New York Central

Spotting Cars

All material unloading points for car spotting should be intelligently marked to avoid any misplacing of cars by switching crews. Different methods are used by the roads to effect efficient spotting. In some cases, cars are marked for spotting as they enter the shop yard, and in others a switching list is prepared after the cars are received in shop yard. The latter condition



Loading Stores Material on the Santa Fe at Topeka, Kan.

is undoubtedly caused by yard crews bringing cars into the shop yard and leaving the actual switching to crews assigned to shop service. Cars, if properly spotted primarily, can, with the assistance of tractors, trailers, etc., usually be completely unloaded without additional switching.

Unloading and Loading Cars

All stores forces and facilities, so far as possible, should be placed under the jurisdiction of one foreman, his duty being to supervise and place the required personnel at the various unloading points, and in sufficient numbers to handle the particular commodities involved. With unified control, the total number of cars handled per day is increased and the total force required is more flexible and need not be as large.

Crane Loads in Open Top Cars

When conditions permit, all heavy items of material, such as bar iron, shapes, sheets, heavy castings, etc., should be loaded in open equipment, in order to permit loading and unloading by magnet or crane. Various sizes of iron shapes should have dividers placed between them so that a chain can readily be placed for their handling by crane.

Less Than Car Load Shipments

When the tonnage of material for shipment to a given point does not justify the use of a car, and tonnage cannot be obtained by combining two or more points, so geographically located that the minimum delay will be encountered. Such shipments should be delivered to the local freight station, as nearly as possible, on the date when a station-to-station car is being forwarded. When shipments for two or more points will supply sufficient tonnage, the cars should be forwarded as outlined under a consolidated shipping schedule.

Car Load Buying

Capacity loading for purchased materials is interwoven with stock control. The stores department should, as far as consistent with proper stock maintenance, order material in carload lots. For purchased material, the purchasing department should, as far as possible, consolidate orders with a view to maximum car loading by the shipper and misuse of equipment, such as failure to load to full capacity, should be brought to the attention of the purchasing department by the consignee in order that the matter can be kept before the shipper.

Misuse of equipment, such as loading company material in two or more cars, that could be loaded in one car, should be handled with the proper official.

The report is signed by Grover Wonnell (chairman), storekeeper, Pennsylvania; F. E. Gragin, general storekeeper, Los Angeles & Salt Lake; J. B. Flannery, general foreman, Illinois Central; J. H. Geary, superintendent stores, Erie; B. W. Griffith, general storekeeper, New York Central; J. C. MacDonald, district storekeeper, Chicago, Milwaukee, St. Paul & Pacific; H. P. McQuilkin, assistant purchasing agent, Baltimore & Ohio; C. S. Palsgrove, district storekeeper, Chicago & North Western; T. H. Ryan, assistant purchasing agent, Wabash; F. W. Taylor, purchasing agent, Southern Pacific; F. C. Turner, traveling storekeeper, Northern Pacific; W. O. Wolfe, general storekeeper, Chicago & Alton; L. C. Thomas (chairman ex-officio), manager of stores, Canadian National.

Discussion

E. W. Peterson (Bangor & Aroostook): It is our practice to use a rubber stamp and put on the purchase order that it would be greatly appreciated if orders are placed so as to load shipments to destination. In that way we can control the use of cars much better.

The Chairman: I don't think that when Mr. Aishton dwelt on this subject in last year's address, he had any idea that we were not alive to the situation. As the incoming chairman, it rather worried me a bit. I talked to Mr. Aishton and he said he didn't have it in mind. I worked with this committee closely and I want to say that the supply departments and the purchasing departments are alive to the importance of helping to move cars.

It is amazing what the committee found in the way of records. The supply departments and the purchasing departments are doing all they can and are showing an improvement.

O. Nelson (U. P.): On our railroad we have tried to surround the sales with every precaution we know to get carload shipments. We are continually in touch with our traffic department. Where we order material in the east, we count on that department to see that the proper kind of equipment is obtained and that carloads are being consolidated. In that way, we have accomplished quite a bit. On the railroad, we endeavor to have a regular schedule of shipping dates, all working to the idea of making as heavy carload shipments as possible.

[*The report was accepted without further discussion.*]

Report on Training Supply Forces

Second committee on subject describes three methods of attacking man power problem

H. M. Rainie
Chairman

Each member of this year's committee was assigned to visit various railroads that are carrying on educational programs.

It has developed that few roads have actually taken up educational work in any form. Definite programs in effect are (1.) the Apprentice system (2.) the Training school, and (3.) Periodic meetings. Some railroads are effectively using a manual arranged to meet their local conditions as a means of educating employees.

The committee recommends definite programs of selection and grading employees:

Selection of Employees

The application for employment by prospects seeking positions should be kept on file and the best qualified men selected. The general fitness of the applicant should be considered and interviews should not be left to a subordinate. It is important that only men physically fit should be engaged. The executive should not only study the applicant for the position under immediate consideration, but should give particular attention to the selection of employees to fill vacancies on higher rated positions as they occur from time to time, and to their fitness and initiative for advancement.

Training for Purchasing

Where possible experience store department employees should be used to fill vacancies in the purchasing department. Thus men with knowledge of material and the methods of material using departments, will be added to the purchasing organization. Periodical meeting of employees should be held where particular commodities are discussed, and text-books and magazines concerned with the work of this department should be used.

The purchasing organization should receive valuable assistance by visiting the company shops, in addition to visiting manufacturing establishments. Contact with the chemical and physical testing laboratories will familiarize the purchasing organization with the functions of the Department of Tests.

The committee also wish to emphasize the value of a temporary exchange of employees where practical. This will enable employees from both departments to obtain information and education valuable to their particular work and to the department, especially where advanced employees are involved.

Stores Department Training

The committee calls particular attention to the fact that the apprentice system, training school, and plan of holding periodic meetings, are entirely separate. Neither of these systems sup-

plants the other. It is, therefore, feasible to have all three in effect on the same railroad:

The apprentice system is a course in storekeeping where boys receive a definite training while working at various positions in and about the store and office.

The apprentice system should cover a four-year training course to allow sufficient time to cover all phases of stores work. It is preferable to educate the apprentice at general or large stores where a broader knowledge can be acquired and he should not replace another employee, but should be an addition to the regular force.

When it is necessary to hire new employees for apprentices, the employee at outlying or sub-stores should be given preference.

The applicant should be given an examination to determine general fitness, and should preferably be a high school graduate. The employer should interview the parents or guardians to make certain they are willing to have the applicant enter as an apprentice; and to leave home if it is found necessary to transfer him to another location. It is desirable that the applicant be put on a six months' probation under close supervision, so it can be determined if he is suited for the course.

Care should be taken not to put on too many apprentices, lest there be no vacancy for them when they have completed their course. The ideal arrangement is to use the graduate apprentice to fill some suitable vacancy when his course is finished.

Apprentice Course

The apprentice course should be a thorough education in all phases of storekeeping, arranged to meet the conditions of the particular railroad, both in the office and wareroom; working in the various sections in connection with ordering, receiving, shipping and storing material.

The apprentice should receive training in the Purchasing Department, also the Accounting Department in Stores Accounting, where accounting is not handled by the Stores Department. Where mechanical apprentice schools are operated, the apprentice should be given an opportunity to obtain special training in mechanical drawing, mathematics, etc. Contact with chemical and physical testing laboratory would enable the apprentice to observe the functions of the Department of Tests. He should be changed from one place to another within a period of not over three months.

The committee recommends that the apprentice shall not have any seniority rights to bid in another position until the apprentice course is completed. At that time he can exercise seniority rights dating back to the date of entering the service.

Training Schools

The training school method differs from the apprentice course in that it may take in any promising employees selected, or those who wish to get a training in one or more specialized lines in the Purchasing and Stores Departments. This would allow employees in higher rated positions to participate in obtaining further education.

The success of such schools is dependent on the selection of competent instructors. They must be thoroughly familiar with the topics, experienced and with teaching ability.

Where a number of instructors are employed one of these should have general supervision of the school. In this manner the instructions will be uniform and the progressive ideas in one location will be made effective at other points.

Greater interest is displayed and better results obtained when the school sessions are held during regular working hours. This can be a one or two-hour session, weekly or bi-weekly, dependent on local conditions.

The committee stresses the importance of tests. A test at each class session covering the instruction of the last lesson helps to keep the mind alert and reveals to the instructor whether the work covered is understood. These tests should be graded and the erroneous opinions corrected. Grading of lessons not only creates desirable competition between scholars and between the different classes, but also reveals to the individual his weak points.

Periodic Meetings

Periodic meetings are meetings of supervisory officers, also experienced and inexperienced help, held at local stores, or joint meetings of division or system stores. The object of the periodic meetings is to discuss current matters and methods.

Meetings of local supervisory forces at store points are an effective means of keeping the employee posted on up-to-date stores practices and efficient methods in ordering and handling material.

The committee has found that some roads are carrying on periodic meetings in the form of a definite course, weekly or monthly, where current matters are discussed and papers prepared and presented on various phases of purchasing and stores practices.

This report is signed by H. M. Rainie (chairman), assistant purchasing agent, Boston & Maine; A. Aiken, office manager, purchasing department, Pennsylvania; V. E. Elliott, traveling storekeeper, Norfolk & Western; G. A. Goerner, traveling storekeeper, Chicago, Burlington & Quincy; J. L. Irish, general storekeeper, Oregon-Washington Railroad & Navigation; J. S. Matthias, general storekeeper, Texas & Pacific; H. A. Paar, assistant general storekeeper, Michigan Central; E. G. Roberts, division storekeeper, Chicago, Rock Island and Pacific; W. Robertson, traveling storekeeper, Chicago & Eastern Illinois; C. E. Walsh (chairman ex-officio), purchasing agent, Pennsylvania.

Discussion

Chairman H. M. Rainie (B. & M.): It may be of interest to the members that the Boston & Maine has been carrying on these meetings. They are held semi-annually. We have an attendance of about 60 members and the courses extend over possibly 12 meetings. We have a complete organization as far as the educational plan is concerned in that we have a direct education. We have a councillor and three men who act as judges in forming the plan for the season and also passing on the papers. There are tests given, so that the management will know that they are accomplishing something in this plan, and those who receive the highest marks were given a trip down to Atlantic City this year to the convention. There are four members here who got the highest marks in this school.

H. H. Laughton (Son): Does it take in clerks?

Mr. Rainie: In the apprentice course they are selected. The training takes in any class of labor, possibly subdivided among the various subjects and instructors who are competent to teach the subjects. It can be extended to all classes..

Mr. Laughton: Suppose you have a stock clerk who has given you ten years of service and has worked up to that position by his efficiency and on account of the reduction of forces in other departments a yard clerk, who never saw a stock room, comes along and bids on this job on a seniority basis, how would you handle that?

Mr. Rainie: We have not attempted to deal with seniority rights, except as stated in the paper. The individual road must work out its own problem because it is very complicated.

Mr. Laughton: I asked the question because it is a fact, not a theory. Under the agreement of the Brotherhood of Clerks, I am under the impression that you can not go from the purchasing department to the accounting department and back to the general store keeper unless you have seniority.

L. C. Thompson (C. N.): Is the yard clerk you speak of, an operating man? I ask that because on our particular road we will allow only store room employees in there. An operating man has no business to bid in. Any position in the store group is allotted to the store employees only. An apprentice has no seniority rights until he completes his four-year term. Then he can bid in positions according to his standing in the store group.

J. G. Warnecke (I. C.): On our road the seniority is limited to our own department. The yard clerks have no right in connection with the apprentice system. We select high-school graduates and have them take the apprenticeship similar to that which is taken in the store department—four years. They are also taken to the meetings. The boys are coming along very nicely and with the shops and school cooperating, we are expecting to inaugurate a night training school, where they can study the various trades and go to school three nights each week. I expect the apprentices to attend that.

We move them from one section to another every four or five months and at the end of four years, expect them to have as thorough knowledge of the store house as we have.

J. C. Kirk (C. R. I. & P.): I would like to answer Mr. Laughton's inquiry from our own experience. We established the apprenticeship system on our road in 1912. Every one of our present stockmen, except one, came up through the apprenticeship school. Practically every clerk in our office started in as an apprentice. We don't have seniority trouble for the reason that our seniority districts are only applied to the store department. No one in any other department would have the right to bid in on any position that is vacant in that department.

Mr. Laughton said that he would like to have a copy of our agreement. Perhaps our being in the apprenticeship work early helped us a great deal when the time came to make our agreement.

When the time came to make an agreement with the Brotherhood Clerks, we went into it with their permission. It is still in effect.

[*The report was accepted as read after the apprentices on the Boston & Maine attending the convention were asked to rise.*]

THE CONTRACT between the Persian government and a syndicate composed of American, British, German and French firms for the construction of a railway line across Persia has been annulled by the government, according to reports reaching London, and published in the Railway Gazette. The line, which was to have extended from the Persian Gulf to the Caspian Sea, has already been partially completed, but despite this fact the reason given for cancellation of the agreement was the "failure of the syndicate to act in accordance with the contract."

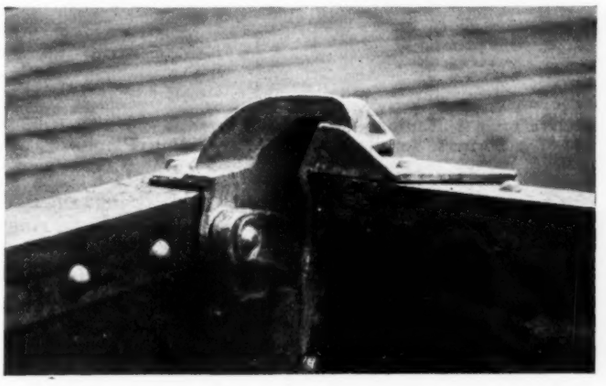
* * *

A Branch Line of the German Railways in the Mountains near Wendelstein

New Devices

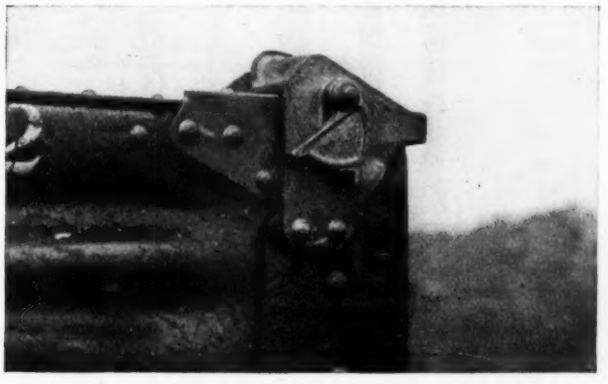
Drop-End Door Lock for Gondola Cars

AMONG the exhibits of the Wine Railway Appliance Company, Toledo, Ohio, will be found a recently developed door lock for drop-end gondola cars. This device has the two-fold purpose of holding the drop end secure in the upright position, while the interlocking feature provides a rigid corner construction, making it impossible for the sides of the car to spread at the corner when loaded to the top with coal or stone.



This Door Lock Is Designed to Strengthen the Corners of the Car

The casting on the corner of the car acts as a tie between the coping angle, the corner post and the side sheet. This casting carries the latch on a trunnion inside of the side sheet, the latch extending through the end of the casting where it is held in the locked position by a pawl riveted to the same casting. The corner casting as applied to the door carries the locking lug, which rides under and past the latch as the door is raised, the latch dropping by gravity in behind the lug to hold the end in its proper position. This casting also carries the upturned flange which engages the corner cap as the door is closed, thereby forming the interlocking feature. The



View of Wine Door Lock From the Interior of the Car

interlocking flanges on both castings are set on a taper so that necessary variations may be overcome in moving the door to a closed position. All parts are made of electric cast steel which insures strength and durability.

India-Rubber Draft Gears and Buffers

THE Waugh Equipment Company, Depew, N. Y., is exhibiting a Spencer-Moulton draw gear and a Spencer-Moulton buffer. The gear is comprised of two groups of india-rubber springs and steel dividing plates which may be arranged to operate either independently or in parallel in draft and buff. The springs

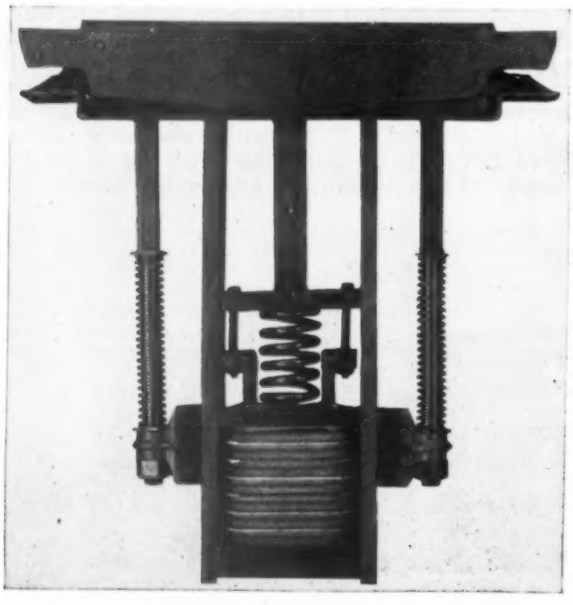
A Draft Gear Equipped with Two Groups of India-Rubber Springs Set Between Steel Dividing Plates

are formed by moulding a series of rubber rings on steel plates, proper spacings being provided between the rings to permit the required flowing action. Interposed between the springs in the groups are steel dividing plates for coordinating the action of the rubber.

The Spencer-Moulton buffer comprises a single group of india-rubber springs with interposed steel dividing plates and is in series with a helical spring. The purpose of the helical spring is to resist the preliminary travel of the platform buffer up to the point of coupling, a travel of approximately 2 in., at which juncture fibre-faced stops on the spring housing prevent further compression of the helical spring. From this point on, further travel in buff is resisted by the rubber springs up to the buff position of the couplers when the resistance is augmented by the buff portion of the draw gear.

Duplex compression curves drawn during recent tests, showed an initial buffer compression of 1,140 lb. which was increased to 1,150 lb. at the point of coupling. From the coupling to the buffing positions of the coupler, the compression was further increased 2,310 lb. by the added resistance of the buff portion of the draw gear. From this point on, the resistance gradually increased to a maximum of 230,000 lb. at a total travel of approximately 5 in. segregated as follows: Preliminary platform buffer travel, 2 in.; coupler travel, coupling to buff travel, ½ in.; draw gear travel in buff, 2½ in.

The draft portion of the draw gear has an initial compression of 500 lb. which gradually increases to a maximum of 115,000 lb. at approximately 1½ in. travel. The compression curves showed no break throughout the range of movement in either buff or draft, indicating the smoothness available in the starting and stopping of trains and in the control of movements between cars during brake applications by the use of the gear.



The Arrangement of the Spencer-Moulton Buffer Equipped with India-Rubber Springs

Double Rotating Chairs

HALE & KILBURN COMPANY, Philadelphia, Pa., is exhibiting double rotating chairs with individual seats which have backs adjustable to several degrees of recline. The chair is equipped with a collapsible division arm rest, a foot treadle release for rotating the chair and foot treadles for reclining the backs individually. The upholstery is of Mohair fabrics of new designs and patterns. The spacing of these

The Hale and Kilburn Double Rotating Chair for Day-Coach Service

chairs is arranged to suit the conditions in each car in which they are used and may be disposed in comfortable vis-a-vis portions for parties traveling together.

Models of this design of chair are on demonstration at the Hale & Kilburn booth. Improvements affording increased comfort in cushion, back shape and spring softness of upholstery are being shown together with the patented double friction-plate eccentric-rotating principle embodied in the chair rotating mechanism.